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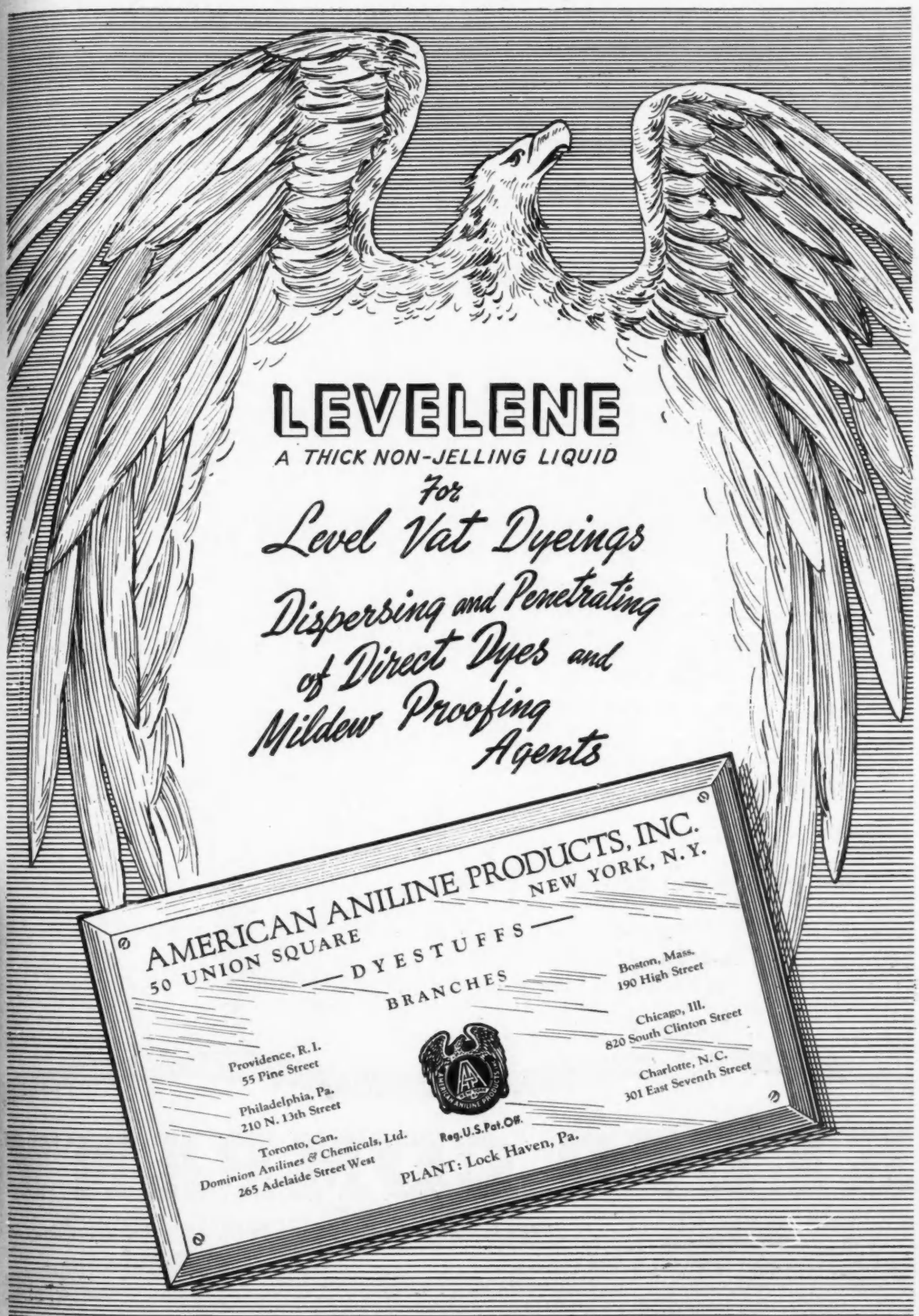
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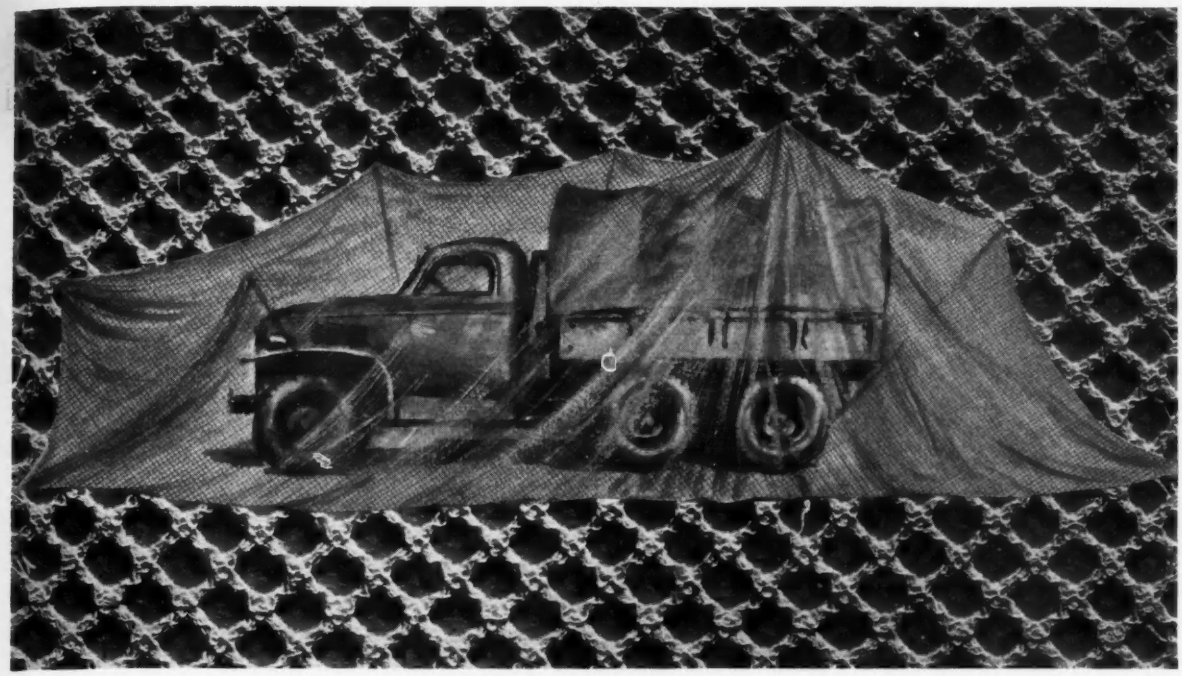

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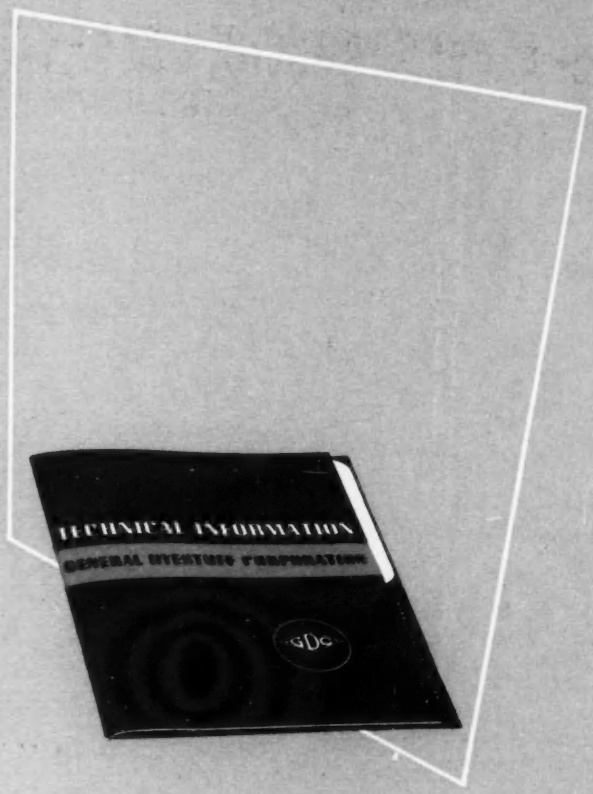

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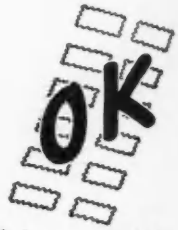

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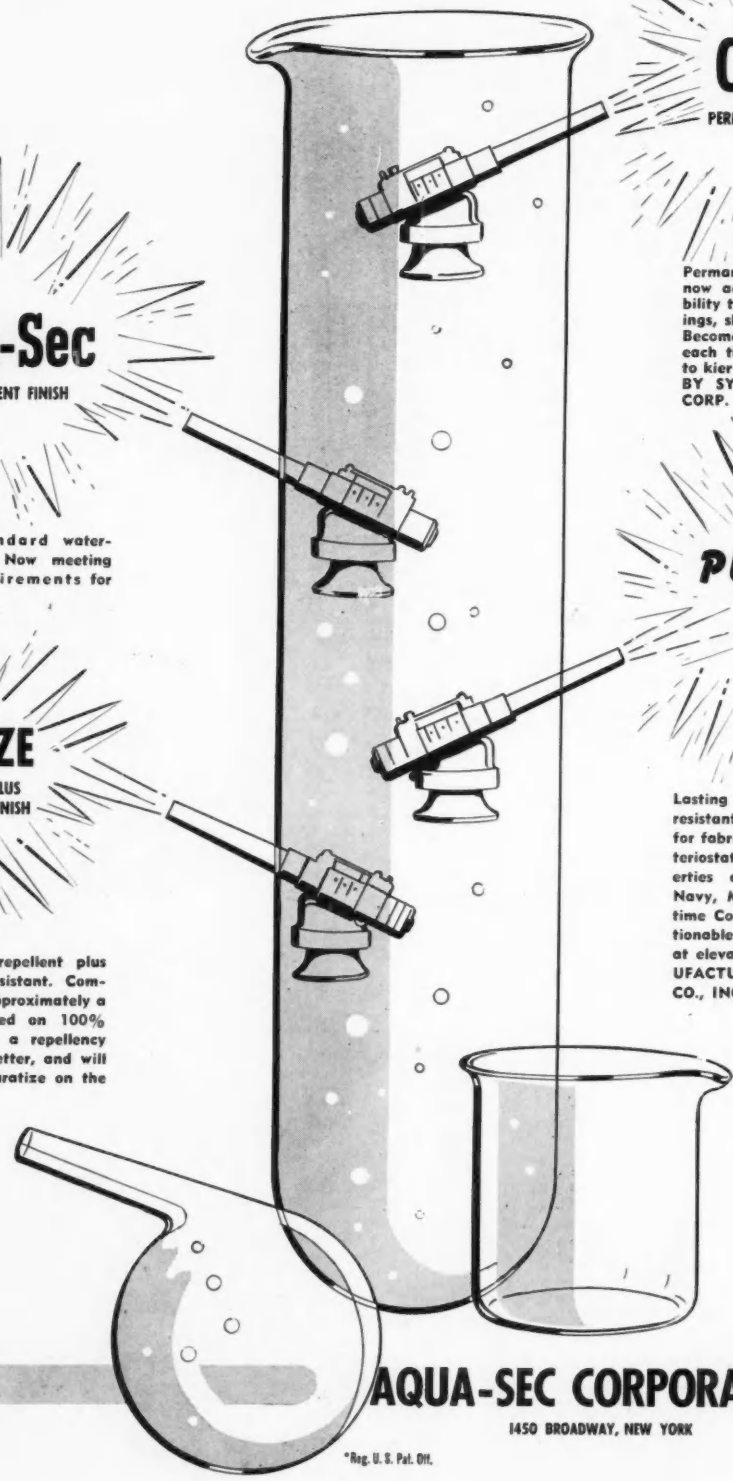

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MAY 24, 1943

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VOLUME 32 MAY 24, 1943 NUMBER 11

Cooperative Studies on a Laboratory Method for Evaluating SYNTHETIC DETERGENTS

J. B. CROWE

*Chairman, Section E, Sulfonated Detergents, Sub-Committee II Specifications Committee D-12, A.S.T.M.**

ABSTRACT

Soiled wool and cotton fabrics were used for evaluating synthetic detergents by members of A.S.T.M., Section E on Sulfonated Detergents, Sub-Committee II on Specifications. These test fabrics were washed in launderometers and graded on photometers. This paper gives a resumé of the conclusions and opinions of the co-operating members, together with brief descriptions of the methods used. Details of a typical procedure used for soiling, washing and grading cotton and wool are appended.

I. FOREWORD

WITH a view to obtaining information on the practicability of laboratory performance tests for evaluating synthetic detergents, Section E, on Sulfonated Detergents. of Sub-Committee II on Specifications, has carried out a series of tests. This study continued over a five-year period and resulted in the accumulation of 90 pages of data and pertinent information. The object of this paper is to give a resumé of the conclusions and opinions of the co-operating members, together with brief descriptions of the methods used.

Four series of launderometer tests were run. In any one series, all of the cloth was prepared in a central laboratory to minimize variations in the test fabrics. Detailed instructions were drawn up for the testing to assure all laboratories following the same technique. The washed fabrics (such as are used for sheeting) were graded on any type of photometer available in each laboratory, and in several instances all swatches from one series were submitted to a central laboratory for grading, after which the results were correlated with those obtained by the individual laboratories.

To aid the reader in a better understanding of the work, details of a typical procedure used for soiling and washing cotton and wool fabrics, and also for measuring detergent performance are attached as an appendix.

II. EXPERIMENTAL

Series I—Wool Fabric Washed With Fatty Alcohol Sulfates

Sodium lauryl sulfate and sodium oleyl sulfate (each 30 per cent active ingredient) were used as the washing agents. The fabric was a light-weight, low-count, low-twist, all wool crepe that had first been thoroughly scoured under textile mill conditions. The soiling media consisted of carbon black, dispersed in carbon tetrachloride in which was dissolved liquid paraffin, edible olive oil and lanolin.

2½ x 3-inch swatches of soiled fabric were washed with 0.1 per cent, 0.2 per cent and 0.4 per cent concentrations of the synthetic detergents, using—

(a) Distilled Water
(b) 0.1 per cent Sulfuric Acid Solution
(c) 0.1 per cent Sodium Carbonate Solution
(d) 0.04 per cent Calcium Chloride Solution

The tests were carried out in a launderometer using standard pint jars containing 200 c.c. of the detergent solution, 20 one-quarter inch monel metal balls and two swatches of the soiled cloth. After a 30 minutes' wash at 120° F., the samples were passed through a wringer, rinsed in water at 120° F., then in cold running water, and finally air dried. The washed test pieces were first graded by whatever photometer was available in each laboratory and sent to a central laboratory so that all samples could be graded on one machine. In this work, the Zeiss-Pulfrich, the Lange photoelectric and Martens photometer, and the Hess-Ives tintometer were used.

*Active members were:—G. H. Alpers, J. E. Doherty, J. C. Harris, H. L. Jones, C. L. Nutting, W. H. Tiffany, B. S. Van Zile.

Discussion of Results

There was considerable variation in the results from the different laboratories. In fact, even when the fabrics were graded in one central laboratory on one machine, wide variations still existed. It was observed that the soiled cloth did not wash evenly, especially where a large percentage of the soil was removed. This made it difficult to get an accurate whiteness grade on the washed fabric. The fabric was so light in weight and so loosely woven that it frayed easily from the action of the monel balls, and shrunk considerably. It was also observed that the cloth tended to roll and remain in a ball throughout the wash, thus undoubtedly contributing to the uneven washing.

Series 2—Cotton Fabric Washed With Fatty Alcohol Sulfates

The detergents and conditions of testing were identical with those used in Series 1, with the exception that soiled cotton was used in place of soiled wool. The fabric was Indian Head 54 inches wide, permanent finish, made by the Nashua Mfg. Co. The cloth was desized and then soiled in a dispersion of "Oil Dag Concentrated" and Wesson Oil in carbon tetrachloride.

More explicit washing instructions were given than for Series 1, hoping to minimize the inconsistencies shown by the previous test.

Discussion of Results

The results obtained with the soiled cotton were in closer agreement than shown by Series 1 with wool. However, there was still considerable disagreement between laboratories as exemplified by the fact that some reported sodium lauryl sulfate superior to sodium oleyl sulfate, some the reverse, while a third group could see no difference.

A disturbing fact was the report by some laboratories that distilled water alone removed more dirt than the highest concentration (.4 per cent) used of both detergents.

Series 3—Cotton Fabric Washed with Fatty Alcohol Sulfates

The same type of soiled cotton and washing technique used in Series 2 was employed in this study. The washing instructions emphasized that the tests should be run within a predetermined time to minimize variations in the effect of ageing on the ease of removal of the standard soil.

Conclusion:—The results paralleled those obtained in Series 2.

Series 4—Wool and Cotton Fabrics Washed with Oleic Amide of the Sodium Salt of Methyl Taurine and also with Alkyl Aryl Sulfonate

The two detergents were: the oleic amide of the sodium salt of methyl taurine (35 per cent active ingredient), and sodium alkyl benzene sulfonate (30 per cent active ingredient). The detailed instructions for soiling, washing, and grading are appended.

The washed pieces were graded in each laboratory and subsequently in a central laboratory using a Lange photometer. In order to eliminate differences in grading procedure between laboratories, the washed fabrics were graded at both ends and in the center on each side, giving a total of six measurements for each fabric. In order to make the surface characteristics of all samples like, the fabrics were ironed smooth before whiteness readings were made.

Discussion of Results

The soil from cotton pieces washed out quite uniformly; the wool samples, however, were mottled in some cases after washing.

There were decided variations in results obtained by the individual laboratories. When graded in the central laboratory, the differences were considerably minimized although unfortunately large discrepancies still existed.

III. CONCLUSIONS FROM CO-OPERATIVE TESTS

The reproducibility of results between different laboratories using soiled cloth for evaluating synthetic detergents left much to be desired. Some laboratories reported difficulty in obtaining check results even in their own individual tests, this in spite of having personnel trained in running launderometer detergency work. For this reason, this method should not be considered sufficiently accurate for referee work on synthetic detergents. However, the procedure might be considered quite useful for control work within an organization, particularly if the detergent application has been correlated with the use of soiled cloth in the launderometer.

If used as a control tool by a laboratory, great emphasis should be placed on the necessity for the personnel following exactly the same procedure in every test. Time of washing, temperature, concentration and volume of solutions, number and type of balls used, speed of launderometer, method of soiling, and age of soiled fabrics are factors having a decided bearing on the results.

IV. GENERAL DISCUSSION

1. Previous History of Soiled Cloth Studies

Some years ago, extensive tests were conducted by the Detergents Committee of the American Oil Chemists Society to evaluate the detergency of soap (not synthetic detergents) using soiled cloth in launderometers. After considerable work, this Committee abandoned the project feeling there was "no possibility of regarding it (the soiled cloth—launderometer method) as a general method of evaluating detergents", . . . although "useful for making comparisons under limited conditions."* Since that work, there may have been some improvements in the manner of applying the soil to the cloth, but there have been no radical changes except to include soiled wool as well as cotton.

2. Synthetic Detergents vs. Soap

Determining the detergency of synthetic detergents is

*Oil and Soap, Vol. 10, P. 232 (1933).

much more complex than with soap. In the case of soap, the products are always used either as neutral soap or built with alkali. With these newer synthetic detergents, however, the products can be used in almost any degree of alkalinity or acidity, with or without neutral salts, with various organic agents, etc. This complicates the problem for a detergent may appear good when used in alkaline solution, but be poor in acid. In contrast, another synthetic detergent may show the opposite behavior.

3. Relation of Soiled Fabric to Dirt Load Encountered in Practice

Soiled fabrics are prepared by more or less "standard" methods, generally by impregnation with a mixture of oily material and some type of carbon. In contrast, the dirt load encountered in practice varies widely in amount, composition and also the way it gets on or into the material. The practical dirt load can vary from a mixture of lime and grease found on sheeps wool to ground-in carbon dirt on a soiled shirt. It can vary from a pigment-pitch blend on optical lense, to an acid inert dirt mix found on pickled metal. Even in such an isolated field as the lubrication of textile fibers, the oil used for spinning varies from saponifiable to unsaponifiable oils and mixtures. Obviously, no one or even two soiled fabrics can duplicate the variety of soils found in practice, all of which are removed with greater or lesser ease during the scouring or washing process.

4. The Effect of Agitation on Dirt Removal

Type of agitation and mechanical action greatly affect the relative detergency of cleaning agents. No one standardized method of agitation, such as is obtained in a launderometer, can hope to duplicate them all. Differences between such means of cleaning as squeeze roll action in washers, revolving cylinders, rotating brushes, soaking and hand scrubbing are great. Each process has a distinct bearing on the ease or difficulty with which soil is removed from the surface to be cleaned.

5. Material Being Cleaned

Any one or two types of soiled fabrics can at best correspond to only a small percentage of materials to be cleaned. In textiles alone, wool, cotton, silk, and the various synthetic fibers attract, hold and release soil to a different degree. In addition, such factors as the twist of the yarn and fabric construction further complicate the problem. This is just one small field in the over-all cleaning problem.

V. GENERAL CONCLUSIONS

Many laboratory evaluations using soiled fabrics in launderometers have shown certain products or combination of products to be outstandingly good or bad. Under actual operating conditions in textile mills and laundry plants, completely different results have often been obtained. For example, soiled wool usually shows alkali to be inert or harmful to dirt when used with certain synthetic detergents. Actually, in practically every case, alkali is found to be helpful under practical conditions of usage.

In view of this, the best method to date of evaluating synthetic detergents for a specific application is under the actual operating conditions where they are to be used.

Appendix

METHOD USED FOR PREPARING THE SOILED FABRICS

A. Cotton

1. *Fabric Used*
   Indian Head, 54" wide, permanent finish, made by Nashua Mfg. Co.
2. *Soiling Formula*
   6 grams Oildag (Acheson Colloids Co., Port Huron, Mich.)
   1.7 grams Wesson Oil
   3000 c.c. Carbon Tetrachloride
3. *Soiling Procedure*
   Cotton strips 5¼" wide x 10 yds. long are washed for 20 minutes in 0.25 per cent tallow soap (88 per cent real soap) at 180° F., thoroughly rinsed, in distilled water, and ironed. These strips are soiled in a machine after which they are dried immediately. The strips are given 3 passes through the standard soil solution which makes them approximately 55 per cent black when tested on the Lange Reflectometer.

B. Wool

1. *Fabric Used*
   Botany Worsted, Style No. 404.
2. *Soiling Formula*
   0.5 grams Lampblack (Grinders No. 2 from Bihn & Wolf Co., Phila.)
   7.5 grams Edible Tallow.
   25.0 grams Nujol.
   4000 c.c. Carbon Tetrachloride.
3. *Soiling Procedure*
   A strip of wool cloth 9" wide and 21' long is soiled mechanically. The cloth is passed through the soiling solution and then through weighted squeeze rolls. The soiling is continued for 10 passes through the machine which requires 16.5 minutes. The cloth is then removed from the machine and dried for one hour in a yarn dryer at 85° C.

Washing Technique

General

The tests were made in duplicate using both soiled wool and soiled cotton fabrics in water containing 50 p.p.m. and 300 p.p.m. hardness.

Test	*Detergent*	*% Concentration*
1	None	None (water of either 50 or 300 p.p.m. hardness will be used)
2	Sodium Carbonate	0.25%
3	The standard detergent "A"	0.25%
4	Detergent under consideration "B"	0.25%
5	Sodium Carbonate + Detergent "A"	0.25% (0.20% Detergent A (0.05% Sodium

Test	*Detergent*	*% Concentration*	
			Carbonate
6	Detergent B + Sodium Carbonate	0.25%	(0.20% Detergent B
			(0.05% Sodium Carbonate

The test pieces washed in water containing 50 p.p.m. hardness were marked with an S; the 300 p.p.m. water test pieces were marked with an H. Since four washes of 10 minutes duration each were made, the tags were marked accordingly. For example, Detergent B in 50 p.p.m. water would bear the designation 4S1, 4S2, 4S3 and 4S4. The 4 refers to the test designation in the above table, S refers to 50 p.p.m. water, and the 1, 2, 3, or 4 refer respectively to the 10, 20, 30, or 40 minute washing intervals. In 300 p.p.m. water this test would be marked 4H1, 4H2, 4H3, and 4H4.

Test Procedure

Reagents

1. Weigh out 17.6200 grams of calcium chloride ($CaCl_2.2H_2O$) and dissolve in approximately 200 ml. of distilled water.
2. Weigh out 19.7200 grams of magnesium sulfate ($MgSO_4.7H_2O$) and dissolve in approximately 200 ml. of distilled water.
3. When both salts have dissolved, make each up separately to one liter with distilled water.
4. Mix the solutions.
5. Add eight liters of distilled water and thoroughly mix the resulting product.
6. For water of 50 p.p.m. hardness dilute 25 ml. of solution from step 5, to one liter with distilled water.
7. For water of 300 p.p.m. hardness dilute 150 ml. of solution from step 5 to one liter with distilled water.
   Note: Distilled water unless freshly boiled will generally have a pH approximately 5.5-6.4. The addition of the salts of steps 1 and 2 to the unbuffered distilled water will buffer the pH at the desired point. *Do Not* adjust the pH of the water with alkali or acid. Use freshly distilled water if necessary.
   The amounts of salts added in steps 1 and 2 produce a water of 2,000 p.p.m. hardness, as p.p.m. $CaCO_3$, sixty per cent of which is attributable to calcium and forty per cent to magnesium.
8. The sodium carbonate used shall be C.P. anhydrous grade.
9. Samples of Detergents A and B were furnished and used "as received."

A. Wash Test—Cotton Fabric

1. Make the wash tests in duplicate in both 50 p.p.m. and 300 p.p.m. water.
2. Detergents and their concentrations shall be as follows:

Detergent	*% Concentration*	
None (use water of required hardness)	0	
Sodium Carbonate	0.25%	
Detergent A	0.25%	
Detergent B	0.25%	
Detergent A + Sodium Carbonate	0.25%	(0.20% Detergent A
		(0.05% Sodium Carbonate
Detergent B + Sodium Carbonate	0.25%	(0.20% Detergent B
		(0.05% Sodium Carbonate

3. Weigh 2.500 grams of sodium carbonate into a beaker, and make up to 1 liter with 50 p.p.m. water or 300 p.p.m. water, whichever is under test.
   Note: Weigh these quantities on an accurate balance.
4. Repeat Step 3 with Detergents A and B respectively.
5. Weigh 2.000 grams Detergent A and 0.500 grams sodium carbonate into a beaker, and make up to 1 liter with 50 p.p.m. or 300 p.p.m. water, whichever is under test.
6. Repeat Step 5 with Detergent B and sodium carbonate.
7. Adjust the temperature of the Launderometer to 140° ± 2° F.
8. Adjust the Launderometer speed *when loaded* to 42 r.p.m.
9. Place 10 rubber balls in each pint container.
10. Preheat the solutions indicated in step 2 to 173° ± 3° F.
11. Measure 100 ml. of solution into each of the jars of the duplicate test.
12. Place the properly marked swatches in the jars (one swatch to a jar).
13. Cap and place in Launderometer and wash for exactly 10 minutes.
14. Remove and drain the jar, discarding the used solution and squeezing excess solution from the duplicate swatches.
15. Cut off a 1½" strip from each of the duplicate swatches.
16. Twice rinse the two 1½" strips of the duplicate determinations in water of the hardness in question. The rinses shall be two, of 100 ml. each at 100° F. and the strips shall be squeeezed five times in each beaker of rinse water. The strips are then air dried.
17. Repeat steps 9 through 10 with the remaining portion of the original swatch until four, 10-minute washes have been made.

B. Wash Test—Woolen Fabric

1. The wash tests shall be made in duplicate in both 50 p.p.m. and 300 p.p.m. water.
2. Detergents and their concentrations shall be as follows:

Detergent	*% Concentration*
None (use water of required hardness)	
Sodium Carbonate	0.25%
Detergent A	0.25%
Detergent B	0.25%
Detergent A + Sodium Carbonate	(0.20% Detergent A (0.05% Sodium Carbonate
Detergent B + Sodium Carbonate	(0.20% Detergent B (0.05% Sodium Carbonate

3. Weigh 2.500 grams of sodium carbonate into a beaker, and make up to 1 liter with 50 p.p.m. water or 300 p.p.m. water, whichever is under test.
   Note: Weigh these quantities on an accurate balance.
4. Repeat step 3 with Detergent A and B.
5. Weigh 2.000 grams Detergent A and 0.500 grams sodium carbonate into a beaker, and make up to 1 liter with 50 p.p.m. or 300 p.p.m. water, whichever is under test.
6. Repeat step 5 with Detergent B and sodium carbonate.
7. Adjust the temperature of the Launderometer to 110° ± 2° F.
8. Adjust the Launderometer speed when loaded to 42 ± 2 R.P.M.
9. Place 10 rubber balls in each pint container.
10. Preheat the solutions indicated in step 2 to 143 ± 3° F.
11. Measure 100 ml. of solution into each of the jars of the duplicate test.
12. Place the properly marked swatches in the jars (one swatch to a jar).
13. Cap and place in Launderometer and wash for exactly 10 minutes.
14. Remove and drain the jar discarding the used solution, squeezing excess solution from the duplicate swatches.
15. Cut off a 1½" to 2" strip from each of the duplicate swatches.
16. Twice rinse the two 1½ inch strips of the duplicate determinations in water of the hardness in question. The rinses shall be two, of 100 ml. each at 100° F., and the strips shall be squeezed five times in each beaker of rinse water. The strips are then air dried.
17. Repeat steps 9 through 16 with the remaining portion of the original swatch until four 10-minute washes have been made.

Evaluation of Swatches

Read the washed, dried swatches on any photometer available.

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Natural Dye Substitutes

A Bibliography

A. E. KARR

ALL over the world there are distributed "flora" which have, and might even now, furnish coloring matters for textiles in case of emergency or local requirements.

This is particularly true of Central and South America and the adjacent islands.

Many studies have been made of such color producing plants all over the world by such authorities as Berthold Seemann, John Horne, Ernst, Pulle, Campbell, Bacher and many others.

We publish the following bibliography which may prove of value to those who may be called upon to make a study of the original sources of extensive investigations which have been conducted upon this subject.

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BOOK REVIEW

Rogers' Manual of Industrial Chemistry. *Sixth Edition. Edited by C. C. Furnas. Written by a group of forty-five distinguished chemists. 2 volumes;* 1685 *pages;* 501 *illustrations. D. Van Nostrand Co., Inc., New York,* 1943. *Price* $17.00.

We believe that the publishers are justified in the statement that this new edition of Rogers' Industrial Chemistry is the most up-to-date, complete reference work in industrial chemistry. Every industry throughout the entire range of applied chemistry is most thoroughly treated—from raw materials to finished products—from basic principles to details of process and equipment. Its exhaustive coverage of new industries, new products, and new processes reflects faithfully the great advances made in recent years. At the same time, it gives the fullest information about all the older methods and processes still in current use.

All the fundamental knowledge that you need in present-day chemical work—including the economic factors, the physical unit operations, and the chemical unit processes—is given in the early chapters, and is then applied specifically to each industry. All of the large chemical industries (and groups of small related industries) are fully described in separate chapters—written by an expert in that particular field. The entire range of American chemistry is covered, including the heavy chemical industries, the electrochemical industries, the fuel industries and their by-products, the refactory and materials of construction industries, the metallurgical industries, the surface coating industries, the organic synthesis industries (including explosives and war gases) and the large group of industries utilizing natural organic materials. The sections on the manufacture of dyes and intermediates and on dye applications will be of particular interest to readers of the Reporter.

The vast fund of essential knowledge is skillfully organized for instant application. Hundreds of diagrams and photographic illustrations clearly show all apparatus and equipment. There are many charts, tables and graphs giving data about raw materials and finished products, process control and plant operation. There is also included complete reference to the chemical literature.

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DEVELOPMENT AND RESEARCH IN THE Q. M. C.*

LT. COL. FRANK M. STEADMAN

Officer in Charge of the Research and Development Section, Quality Control Branch, Procurement Division, Philadelphia Quartermaster Depot.

DURING the history of the Army, there has been a tremendous change in the methods of determining and meeting military requirements in clothing and equipage. Throughout the early years of the Revolution, provisions for clothing the Army were largely a hit or miss proposition with, in the beginning, the men providing their own clothing. All of you are familiar with the privations endured by Washington's poorly clad troops at Valley Forge. As a matter of fact, 4,000 of those troops were reported "unfit for action" because they were without even the rudiments of a proper uniform. Officers and men alike were often barefooted and in tatters, due to a hopelessly inadequate supply organization rather than to any shortage of materials.

Clothing the Army was under the control of an inefficient Cloathier General who was soon discharged. A Congressional Committee, called the Board of War, then sought to clothe the Army. Following that, a system of State Cloathiers was tried which likewise proved a failure. Then, in order to centralize the clothing of the Army, a Cloathier General was appointed with broad powers and entire control over the clothing of troops. He was to have a Deputy in every State to cooperate with a State Agent who was to import and purchase goods toward a State quota of supplies. History is vague for the period from the end of the Revolutionary War until the war of 1812. Apparently every type of scheme was used, from the Secretary of War himself contracting for the clothing for the, at one time, 1200-man army, to purchase by civilian "contractors of provisions" at each post, for the troop stationed there. It was not until after the War of 1812 that effective centralized control was effected.

From this crude beginning has gradually evolved our present system of meeting military requirements in clothing for the Army. Instead of a hit or miss method of procurement to meet the personal desires of those in command, there has evolved a carefully coordinated method of determining what the actual requirements are, and of meeting those requirements without interfering unduly with requirements for other munitions of war. Those requirements as to nature and performance of an item are called its Military characteristics, and include a list of the characteristics which it must or should possess in order to meet the rigors of campaign and afford the protection so necessary to the user. The determination of these military characteristics and the research and development to meet them involve many components of the Army and industry alike. Not all research and development is directed toward meeting a stated military characteristic. New materials and methods permit the supply services to change the military characteristics by offering hitherto unavailable properties.

The Quartermaster Corps' problems in clothing the Army have been, up to comparatively recently, largely a matter of determining the required amounts, and of securing their delivery for the use of the Army. Some changes of design were made during the Spanish American War. Again, changes of design evolved from the World War. However, only during the period of present conflict have there been new characteristics, of any magnitude, to be met. You are familiar with the dispersion of our Forces to the four corners of the World, and the fact of their operation in every type of climate conceivable, from the Tropical Jungles to the Arctic, and in that most uncomfortable theater of war, the Desert. Those climatic requirements alone are sufficient to increase our needs for special protection many times over, but, along with that factor, we are faced with the problems posed by new methods of warfare, new vehicles of attack, and new tactics. Never before had tank crews and other Armored Force personnel operated at speeds up to 60 miles an hour; never before had we had Parachute Troops. All of these factors have produced a tremendous impact of new military characteristics, some of which unquestionably had to be met by new designs or by clothing and textiles affording qualities far superior to anything which had been previously needed.

For an appreciation of the manner in which military characteristics are determined, and how they continue to be met in an ever changing world, an understanding of the organization of the Army and its supply agencies is necessary. The Army is divided into three general groups, the Army Ground Forces; the Army Air Forces; and the Army Service Forces. The Ground Forces and the Air Forces combine to form the "Air-Ground" combat team of the Army. The Army Service Forces (until recently called the Services of Supply) comprise the various supply agencies which perform the functions of supplying all of the requirements of the Army, with the exception of technical equipment for the Air Corps, which that Organization procures.

Your attention is invited to the relationship and the joint chain of command from the Chief of Staff and the Undersecretary of War to the Commanding General of

*Presented at meeting, N. Y. Section, Nov. 16, 1943.

the Army Service Forces. From the Chief of Staff emanate the military requirements; from the Undersecretary of War, the control of procurement, the commercial end of the Army.

The Army Service Forces are divided into four principal groups, the Staff Division, the Administrative Services, the Supply Services, and the Service Commands. The mission of the Army Service Forces is to develop, design, manufacture or otherwise procure,—transport, store, distribute, issue, maintain, repair and salvage all military supplies and equipment (other than those peculiar to the Army Air Forces) for the Army and, to some extent, for other United Nations; to provide military personnel for the Army and civilian personnel for administrative duties; to train personnel for service units of the Army Service Forces and for the Army Ground Forces and Army Air Forces upon request; to provide necessary services for the Army, including administrative, financial, legal, judicial, internal security, and statistical services; to provide for the transport, shelter, health, and welfare of Army personnel; to construct new facilities and to provide fixed communication services to the Army.

In the performance of that portion of the mission which relates to and affects research and development, the functions of the Headquarters of the Army Service Forces include:

1. Determination of requirements and available resources.
2. Conduct of research and experimentation on the design of supplies and equipment.
3. Procurement through purchase or manufacture of supplies and equipment.

The Office of The Assistant Chief of Staff for Material is the organization which is primarily concerned with those functions. It is through that office of the Army Service Forces that the Quartermaster Corps receives information as to the military characteristics required in the items which it procures.

As one of the supply Services of the Army Service Forces, the Quartermaster Corps is responsible for many activities, including the procurement, storage, and issue of equipage, general supplies, fuel and items of a non-military nature; the operation of the remount and dog training activities; the operation of national military parks, monuments, and posts, and the formulation of policies for the operation of national cemeteries; and the disposition of the deceased personnel of the Army. However, first and foremost, the Quartermaster Corps feeds and clothes the Army. The office of The Quartermaster General performs, among many others, the following staff functions of the Commanding General, Army Service Forces, which are concerned with textiles and clothing:

1. Plans and supervises the procurement and production of clothing and equipage.
2. Conducts research on, and design and development of new and improved Quarterwaster items, and arranges for field tests for the suitability of such items.
3. Prepares specifications for Quartermaster items, including considerations of military characteristics, availability of raw materials and industrial production facilities.

To carry out the mission of The Quartermaster General, and to perform the functions incident thereto, including many which have not been mentioned, the Office of The Quartermaster General is organized into various administrative and operating divisions including the Military Planning, Procurement, and Storage and Distribution Divisions. The Military Planning Division is the one charged with material and production availability studies, Research and Development, and control of field service testing. In that Division the Research and Development Branch is charged with the development of new items, improvement of old items, approval of Quartermaster Corps specifications, investigation of problems of production of materials, recommendations for action to insure conservation of critical materials, the translation of Army supply programs into requirements and materials, and the exercise of supervision over the use of such materials.

The Philadelphia Quartermaster Depot is one of the operating field agencies by means of which the Quartermaster Corps performs its functions of Procurement, Research & Development. The two Divisions of the Depot which are directly in the chain of research and development are the Procurement and the Manufacturing Divisions. Primarily, Research and Development is performed by the Research and Development Section of the Quality Control Branch of the Procurement Division. However, the Manufacturing Division, as well as being a source for the production of clothing, flags, guidons, and special items and for confidential items, is an important clothing design and manufacturing laboratory for the development of new items of clothing, and for the translation of requirements and designs of clothing into practical items for commercial manufacture.

The requirements for research and development emanate from three sources or causes; new or altered military characteristics, the necessity of changing the basic material due to shortages, or the development of new materials or methods of manufacture or finishing.

There are three general sources of new requirements for Quartermaster items which may cause major changes in existing items. Those three sources are from the using arm services, due to requirements of their tactics and technique or the climatic conditions of new theaters of operation; or from the Army-Navy Munition Board and the War Production Board to meet existing shortages; or from Industry as a result of new developments which permit improvement in existing items without interference with other requirements. All of those new requirements may involve a greater or lesser amount of research and investigation as to the possibility of manufacture and the suitability of the product to withstand the conditions

of storage and of service. Storage conditions in the Army are no worse nor no better than in most commercial enterprises. However, there is no possibility of processing supplies explicitly for delivery to any particular climatic area except for those items which are designed purely for use in such an area. For example, it would be impossible from an administrative angle to process all cotton fabrics to be made into garments for tropical areas to give them the mildew resistant characteristics desirable for such an area.

Changing tactics and technique and equipment of war and the variation in the climatic conditions of theaters of operation, present new problems to the Army Air Forces and the Army Ground Forces in the field. Those arms and services, with their Boards for the testing of new items and new technique, present to the General Staff of the War Department their needs for improved or new items of equipment. In presenting those, a general outline of the military characteristics of the new or improved items are furnished. After consideration by the General Staff, those requirements are passed on to the Commanding General of the Army Service Forces for appropriate research and the development of the finished article. Through the office of the Assistant Chief of Staff for Material those requirements are then transmitted to the appropriate service force for the development and presentation of the item. For clothing and personal equipage that service force, as has been previously stated, is the Office of the Quartermaster General.

The development of shortages in critical material often necessitates changes in the primary requirements, and research and development of new products, finishes or methods of fabrication, or the examination of existing products to adapt them as satisfactory substitute materials. The decision that such shortages of basic materials require modification of an item may result from either the Army-Navy Munition Board's decision that, in a particular instance, military requirements dictate the use of such a critical material in some other application, or the decision of the War Production Board and the Army and Navy Munition Boards that civilian economy requirements are such that reductions in both military and civilian requirements are necessary, necessitating substitutions to meet the overall military requirements. Every effort is made to anticipate possible restriction in supply, keep under way general investigation or surveys, often informal, and to tentatively select and investigate the possible substitutes. The technical journals, as well as reports of availability, afford information as to impending shortages, and the former often constitute a source of suggestion directly or indirectly as to substitution possibilities. The submissions by industry of new materials, new finishes, and new methods of fabrication, and reports of such development contained in trade and technical literature, not only constitute a source of information by which to solve problems presented by higher authority and by shortages, but, as well, permit the offering of items of superior characteristics to the using arms and services. Neither the Depot nor the Office of The Quartermaster General is hesitant about following up any lead reported in technical literature, to determine the suitability of the product or process for use on military fabrics. Many of those submissions by industry are made direct to the Research and Development Section of the Philadelphia Quartermaster Depot, while equally as many others are submitted to the Office of The Quartermaster General, of which a large number are rerouted to Philadelphia for laboratory testing, study, investigation and recommendation. From each office many of the proposals, of questionable value, are rejected, without submission to the other office, in order that valuable time of the limited staffs available, may not be needlessly expended for proposals which offer no promise of future development, or of useful application. For instance, one proposal which was made sometime prior to the outbreak of the hostilities was for the use of a sheet copper legging, to protect the wearer's shins from shrapnel. This proposal, made in perfectly good faith, was, of course, rejected, because not only would the sheet copper afford no material protection to the wearer, but any of the copper which might be carried into a wound would constitute a real source of infection.

The organization of the Research and Development Branch of the Office of The Quartermaster General, like the Research and Development Section at the Philadelphia Quartermaster Depot, is sub-divided largely on what might be termed a commodity basis. Both offices are concerned both with research and development, and with production possibilities of any item under consideration. The function of the branch in the Office of the Quartermaster General is primarily control and coordination of all activities. In order to adequately perform these functions, it is staffed with competent technical personnel in each of the commodity sections. As a result, that office is often able to answer problems without the necessity of referring them to operating agencies for investigation or test. That office, through it technical personnel, likewise contacts directly various individual plants which are peculiarly equipped with the information or facilities by which to answer the problems at hand. Many of the specific investigations on research problems are assigned to the Quartermaster Depots where laboratory facilities and technically trained personnel are available for the necessary research and development work. The services of the Bureau of Standards, National Defense Research Committee, and other governmental laboratories, as well as cooperating individuals and organizations, are used wherever advantageous. The experience, both military and technical, of the personnel of the Research and Development Section and the laboratory facilities of the Philadelphia Quartermaster Depot, consequently, are continuously utilized by the Office of The Quartermaster General.

For field testing, the services of the Quartermaster Corps

Board, Camp Lee, Va., are utilized. That organization is composed of qualified commissioned officers with substantial military, as well as appropriate civilian experience, of selected enlisted personnel, and of technical personnel, including statisticians and skilled research workers. The Quartermaster Corps Board conducts product testing to determine whether or not new products developed meet the changed requirements of modern warfare, or whether the substitutes developed are adequate for the purpose under field conditions.

To carry out the research and development work in all of its phases at the Philadelphia Quartermaster Depot, there is organized, as part of the Quality Control Branch of the Procurement Division, a section which has grown in approximately 8 years from 1 Officer and 3 civilians to 15 Officers and approximately 70 civilians, of whom 14 of the Officers are technically qualified, and 20 civilian personnel constitute the technical staff. The other section of the Quality Control Branch is the Inspection Section, which is divided into Depot Inspection, Field Inspection and Laboratory Inspection. Constant contact is had with those 3 units of the Inspection Section in order that the Research and Development Section may be constantly up to date on any difficulties which may arise in the manufacture, or fabrication, of textiles or clothing, or allied items.

While the laboratory facilities and the majority of the personnel of that unit are primarily used for the inspection of submissions by contractors to determine compliance with specifications to the extent that well over 100,000 samples per month are examined and tested in that laboratory, the Research and Development staff have full use of the laboratory, and have working in it, full time, approximately 10 qualified personnel under the direct supervision of an Officer. This personnel, in addition to performing such tests as may be necessary in direct controlled development projects, are constantly employed in investigative work of various types.

For instance, your Research Committee is aware of the extensive investigation which has been carried out, and which is being continued, in an effort to determine an adequate method of testing sulphur dyed fabrics to determine whether or not the finishing and dyeing processes have been so carried out that the possibility of tendering of such materials is minimized. This project is, of course, the subject of study by a research committee of the A.A.T.C.C. A preliminary report was submitted to your Committee on "Fastness to Light" at the last meeting in Boston, covering work which was done in evaluating the usefulness of the Hunter reflectometer to measure degrees of fading. Corrolary to that work and involving the spectrophotometric measurement of color, study is being given to and work is now progressing on the possibility of identifying colors of Army fabrics by the I.C.I. Tri-stimulus values and the I. S. C. C.-N. B. S. standard nomenclature. Another project, which is under way, is the investigation of the effect of various finishing procedures on cotton fabrics, as to their resistance primarily to attack by halogen acids, and secondarily to wear and laundering. There will be presented to the Committee on measurement of water resistance of fabrics, on April 17, 1943, the results of experimental work intended to make the absorption test more nearly reproducible for a wider range of fabrics. Difficulty has been encountered in using the standard methods to determine the water repellency characteristics of alpaca pile and heavy wool overcoating fabrics.

The subject of mycology has not been overlooked. As you can appreciate, the soldier, especially in the tropics, is unable to keep his clothing and equipage dry. Consequently, mildew is an ever present factor to be considered. It is of more importance on the items of equipage, which are less subject to wear, than on his clothing which will all too soon be reduced to rags and tatters by the service which it must withstand. Investigation has been made of test methods, and of the characteristics of various fibers and of the various fungicidal agents. The services of the Office of the Surgeon General, and of the Public Health Service, have been used in determining dermatological reactions of the various compounds proposed upon those who must wear, and use, articles so treated. The Department of Agriculture, which has pioneered in such investigation, and the various commercial laboratories, particularly those which are interested in the manufacture of fungicides, have cooperated very materially, in this investigation. An Officer of the technical staff at Philadelphia is a member of your Research Committee on Mildew Resistance, and is serving, at the same time, on the Federal Specifications Executive Committee, in the preparation of a proposed draft of a Federal Specification to cover test methods for mildew resistance.

The Research staff of Philadelphia pioneered in the consideration of polyvinyl resins as a coating for fabrics for raincoats. After a long discouraging preliminary study, the severance of the lines of supply of natural rubber precipitated, in January of 1942, an unprecedented experimental procurement of 1,200,000 raincoats of synthetic resin-coated fabric. Some of you are familiar with the many headaches which plagued the coaters and fabricators prior to the completion of that order! There were shortages of the original resin, plasticizers and of solvents. Adequate test methods had to be developed to insure the acceptance of merchandise which would be satisfactory for field service, and which would withstand the unpredictable storage conditions, prior to their being placed in service. Those synthetic resin raincoats were manufactured from the polyvinyl chloride, polyvinyl acetate, copolymers and both the thermo plastic and thermo setting polyvinyl butyral compounds.

The above are but a few typical examples of the research and development activities of the Philadelphia Q.M. Depot carried on in accordance with the general plan of control described in the first part of this paper.

Report of Committee on
Group M—Fastness to Washing of Dyed and Printed
MANUFACTURED ORGANIC FIBERS

DANIEL P. KNOWLAND
*Chairman**

INTRODUCTION

As rayons are very similar to cotton and are often woven together, the committee tried the Cotton Standards for rayon and found them inadequate regarding their fastness. For example Standard No. 1—Diamine Fast Blue FFB (Pr. 71) and Standard No. 2—Primuline-Beta Naphthol are too fugitive and it was decided to improve these standards. Doing so, necessitated visiting laundries, testing laboratories, testing bureaus, as well as investigating the methods of home laundering of the various members of our Committee. Also, great importance was given to the decoration on garments. We found that in the laundries there is more care and control than in home laundering as garments are sorted as to cloth, decoration, trimming such as collars and cuffs, etc.

We would like to call your attention to the Cotton Wash Fast Method on Page 197 of the 1942 Yearbook where it is suggested one use a 2″ x 4″ piece of dyed or printed material with an equal size piece of white material, allowing a test composed of 50 per cent white and 50 per cent dyed provided the materials are completely dyed or 100 per cent printed. We have found some laboratories not only using a piece of white cotton but also an equal size piece of white rayon giving a ratio of dyed 33 1/3 per cent and undyed 66 2/3 per cent which, in the opinion of the Committee, is too great a proportion of white. Therefore, we have visited various department stores, tailoring establishments and the cutting-up trade, etc., and we find that this ratio of white is too high; in fact, we find that between 5-10 per cent to be a fair average of trimming that has any bearing on wash fastness tests. On the strength of this, we have advocated a piece of test cloth 4″ x 8″ instead of 2″ x 4″ with 1 sq. in. of bleached cotton muslin and 1 sq. in. of rayon test cloth to be made similar to our worsted standard test cloth (see Page 223 of the 1942 Yearbook) only this new test cloth shall be composed of bright rayon with floating fibers as follows—wool, cotton, nylon, dull viscose, dull acetate and dull bemberg. Such a cloth can be made and one manufacturer is ready to supply the A.A.T.C.C. When tests are ready we will then have a piece of material 32 sq. inches along with 2 sq. inches of undyed material.

In reading our report, you will see we have changed Standard No. 1 from Diamine Fast Blue FFB (Pr. 71) to Artificial Silk Black G (Pr. 16) and Standard No. 2 from Primuline-Beta Naphthol to Primuline-Naphtholate AS. Standard No. 3 remains Vat Blue 2BD (C. I. 1184). Standard No. 4 we have dropped as we feel that rayon should not be washed higher than 160° F.

PREPARATION OF THE SAMPLES

Pieces: To a piece of the colored material, 4″ x 8″, sew a 1″ square of bleached muslin[1] and a 1″ square of rayon test cloth[2].

Yarns: Approximately 5 grams yarn is braided with approximately ¼ gram white cotton yarn and ¼ gram white viscose yarn.

LAUNDEROMETER TEST

For description of the Launderometer, see A.A.T.C.C. 1942 Yearbook—Page 193.

The Launderometer is half filled with water at the temperature of test. The sample is put into the glass jar containing 100 cc. soap solution[3] and ten 3/16″ diameter steel balls. The jars are then tightly closed and clamped into the machine. They are rotated for 30 minutes, during which time the bath is maintained at the required

*Committee: Arthur I. Anderson, P. J. Ariente, J. Robert Bonnar, William H. Cady, Charles H. Church, Ephraim Freedman, Arnold L. Lippert, W. F. Macia, O. F. Marks, Edmund F. Monroe, C. Norris Rabold, Robert R. Robertson, Walter M. Scott, Philip H. Stott, Charles A. Seibert, Arthur Wachter, George H. Wood, Jr.

[1]This proportion of colored cloth to white is based on the average proportion of white (as trimming for example) combined with color in most manufactured garments. The amount of white in a print, exclusive of trimmings, varies so greatly with the percentage of white in the design, that no specifications can be set to cover all prints.

[2]This test cloth is of viscose taffeta with floating yarn of wool, cotton, nylon, viscose, acetate, and cuprammonium rayon. It will be obtainable from the Association through L. A. Olney, Chairman of the Research Committee, Lowell Textile Institute, Lowell, Mass.

[3]The soap is to be a good grade of neutral white chip soap, conforming to the Standard Specification for Chip Soap of the American Society for Testing Materials (A.S.T.M. Designation D 496) of the Federal Specifications for Chip Soap (PS 566). The soap solution contains 5 grams per liter on the basis of an 88 per cent soap, although an equivalent amount of soap having a higher or lower strength may be used.

temperature. The samples are then removed from the jars, rinsed in first warm water then in cool water, and wrapped in a clean white towel or similar cloth. The excess of water is removed by centrifuging or squeezing. The samples are taken out of the towel and dried with an iron at moderate temperature (275-300° F.). The white muslin and test cloth should not be ironed against the colored sample.

Specifications

Test Method	*Time*	*Temperature*
No. 1	30 min.	105° F.
No. 2	30 min.	120° F.
No. 3	30 min.	160° F.

EVALUATION OF COLOR FASTNESS

The color of the specimen shall be compared by eye with the color of the corresponding unwashed specimen. In making the comparison, the specimens shall be held in the same plane and viewed at the same angle under a standard daylight lamp or equivalent illumination.

A specimen shall be considered as passing a given test when there is no appreciable change in color and also no appreciable staining of the white cloth attached to it. "Appreciable change" shall be understood to mean a change which is immediately noticeable in comparing the tested specimen with a corresponding unwashed specimen; "appreciable staining" shall be understood to mean staining which is immediately noticeable without comparing the white cloth attached to the tested specimen with a piece of the original white cloth. If closer inspection is required to make apparent the change in color of staining, the change shall not be considered appreciable.

COLORFASTNESS CLASSIFICATION AND REPORT

The specimens shall be assigned to the highest classification for which they qualify under the following scheme, and shall be so reported:

Class 1 show no appreciable change in color and no appreciable staining of the attached white cloth in Test 1.

Class 2 show no appreciable change in color and no appreciable staining of white in Test 2.

Class 3 show no appreciable change in color and no appreciable staining of white in Test 3.

STANDARDS FOR COMPARISON

For convenience in grading the tests, a standard dyed sample for comparison has been established for each class of fastness. It is a guide as to what constitutes a satisfactory degree of fastness to pass a given test.

The washing test should be carried out comparatively against the corresponding standard dyed sample which has been prepared for the purpose (the standard dyed sample, as piece goods, should be compared against piece goods, while if yarn, should be compared against a standard dyed yarn). The results of the test are determined by comparison with the change of shade and staining of white fabric produced by the same test on the corresponding standard dyed sample.

STANDARD DYED SAMPLES

The standard dyed samples dyed on piece goods or rayon are as follows:

M—1 A 1½ per cent dyeing of Artificial Silk Black G (PR 16).

M—2 A 4 per cent dyeing of Primuline Conc (C.I. 812) diazotized and developed with Naphthol AS.

M—3 A 2 per cent dyeing of Vat Blue 2 BD 100 per cent Powder (C.I. 1184).

These standard dyed samples dyed with the above specified dyestuffs and according to the standard dyeing procedures as specified below, will be available for distribution.

DYEING METHODS FOR STANDARD-DYED SAMPLES

All dyeings are made on bright viscose taffeta or yarn.

M—1 1½ per cent dyeing of Artificial Silk Black G (PR 16).

Dyestuff: 1½ per cent weight of rayon.
¼ per cent Igepon T Gel or a similar compound.
Common salt: 10 per cent of weight of rayon.
Dye bath: 40 times weight of rayon.

Enter scoured and wetted material into dye bath and bring to 200° F. Work for 10 minutes and add 5 per cent common salt, work 10 minutes more and add balance of common salt. Total dyeing time 1 hour at 200° F. Rinse, the piece goods should be dried on a frame if possible.

M—2 4 per cent dyeing of Primuline Conc (C.I. 812) diazotized and developed with Naphthol AS.

Dyestuff: 4 per cent on weight of the rayon.
¼ per cent Igepon T Gel or similar compound.
Common salt: 10 per cent of the weight of the rayon.
Dye bath: 40 times the weight of the rayon.
Sodium nitrite: 2 per cent of the weight of the rayon.
Hydrochloric acid 20° Be:
8 per cent of the weight of the rayon.
Naphthol AS: 3 per cent of the weight of the rayon.

Enter rayon in dye bath containing the dyestuff, bring to 200° F. and add 5 per cent common salt, work for 10 minutes, add 5 per cent common salt, continue to work for a total time of 1 hour. Rinse and enter into a cold bath containing nitrite and hydrochloric acid, work for 20 minutes. Rinse well, and enter into cold bath containing the dissolved Naphthol AS and work for 20 minutes. Rinse, soap for 5 minutes at 120° F. with a 0.1 per cent neutral soap solution, rinse, dry the piece goods on a frame if possible.

M—3 2 per cent dyeing of Vat Blue 2 BD 100 per cent pdr. (C.I. 1184).

Dyestuff: 2 per cent of the weight of the rayon.
Sulfonated castor oil:
½ per cent of the weight of the rayon.
Caustic soda dry: 10 per cent on the weight of the rayon.

Hydrosulfite of Soda Conc Powder 90 per cent:
15 per cent of the weight of the rayon.
Dye bath: 40 times the weight of the rayon.

The dyestuff is pasted with sulfonated castor oil. The caustic soda in the form of a 5 per cent solution is added, and the bath is brought to ¼ of its final volume. The hydrosulfite of soda is sprinkled in, the solution brought to 140° F. and reduced at 160° F. for 20 minutes or until the reduction is complete. The balance of water is added and made up to volume at 140° F. The scoured and wetted material is added and worked at 140° F. for ¾ of an hour. Lift, squeeze, and air oxidize for 5 minutes. Rinse cold, then warm, acidify with 0.5 per cent solution of sulfuric acid, rinse cold. Soap at 200° F. for 5 minutes with a .33 per cent solution of soap. Rinse, dry the piece goods on a frame if possible.

MEETING, MID WEST SECTION

The Spring Meeting of the Mid West Section was held at the Schroeder Hotel, Milwaukee, Wisconsin, May 1, 1943.

The afternoon meeting was held at 3 P.M. Forty eight members and guests attended. Motion pictures were shown at this meeting. The subjects covered were—Reclamation of Rubber, Modern Plastics and Synthetic Rubber. Meeting adjourned at 4:45 P.M.

Dinner was served at 7:00 P.M. and attended by seventy two members and guests.

The meeting was called to order by the Chairman, Virgil Hartquist. The Secretary and Treasurer submitted their reports which were approved.

Elmer Smith gave a report of the outing committee. Mr. Hartquist called for a vote by the members as to whether an outing should be held or not. Thirty-six members voted—twenty no and sixteen yes. It was decided not to have an outing this year.

Henry E. Millson, of the Calco Chemical Div. American Cyanamid Co., was then introduced and spoke on the Microscopic Observation of Union Dyeing. This talk was illustrated with slides and was very well received.

The meeting was then adjourned at 11:00 P.M.

Respectfully submitted,

LOUIS HOEHN, *Secretary*

MEETING, SOUTHEASTERN SECTION

THE Southeastern Section held a regular meeting on April 17th, 1943 at 7:00 P.M. at the Athletic Club in Atlanta.

This meeting was largely attended and was entertained with a showing, by the Engineering Corps of the U. S. Army, of the picture "The World At War." This was followed by a talk by Sergeant Patrick Smith of Fort Benning, Georgia, formerly an editorial writer of the *New York Daily Mirror*, who had spent several years in Japan.

Both picture and talk were highly educational and gave everybody a new thought as to the seriousness of this war, and they went away with a new determination to do their best.

Respectfully submitted,

LEE L. BAKER, *Secretary*

MEETING, RHODE ISLAND SECTION

THE last meeting of the season of the Rhode Island Section was held at the Providence Engineering Society Hall on April 30th, 1943. The chairman, Mr. King, opened the business session by calling for several reports. The secretary read the minutes of the last meeting and some correspondence. Edward Allard reported for the outing committee that his associates have decided to hold one as usual in June, with further announcements later. For the Intersectional Contest Paper, Frederic Prisley mentioned the subject chosen and asked members to contribute. The Treasurer, R. R. Farwell, detailed the expenditures and receipts for the past year and showed a favorable balance. He also presented a $25 War Bond to Alberic T. Massi, winner of the "Help Win the War Contest" sponsored by our Section.

Thomas Roberts reported for the Nominating Committee which recommended that all the present officers be reelected. There was no opposition and so the officers for the coming year will be—Chairman, Howard V. King; Vice-chairman, Harold B. Sturtevant; Treasurer, R. R. Farwell; Secretary, Robert W. Joerger.

Mr. Sturtevant was called upon and explained some of his plans for programs for the coming year.

The speaker of the evening was Fred G. LaPiana, Textile Research Chemist at Stein, Hall & Co., Inc. whose subject, "The Application of Water-Dispersed Pigment Colors to Textiles" explained the usefulness of the new method in dyeing and printing of cotton and rayon goods. A question-and-answer period followed.

Four reels of motion pictures were then shown exhibiting Washington in war time and civil defense subjects.

The attendance was about 75.

Respectfully submitted,

ROBERT W. JOERGER, *Secretary*

• CALENDAR •
OF COMING EVENTS

Meeting, Piedmont Section, Robert E. Lee Hotel, Winston-Salem, N. C., June 5, 1943. Discussion chairmen: Ernest Caswell, "Hoosiery Dyeing, Ingrain and Piece"; John Neely, "The Dyeing and Finishing of Government Fabrics Composed of Rayon, Nylon and Acetate"; Sidney M. Cone, "The Dyeing and Finishing of Cotton Piece Goods for the Government." See notice on page P227, May 10th issue.

Council and Research Committee Meetings, June 19. Providence, R. I.

• APPOINTED FINISHER LICENSEES

Hand Printers, Inc., of Baltimore, Md., The Aspinook Corporation of Jewett City, Conn., and The Lawrence Print Works, of Lawrence, Mass., have been appointed finisher licensees under the American Viscose Corporation's "Crown" Tested Plan, being fully qualified to dye and finish rayon fabrics in accordance with the "Crown" Tested minimum requirements, it was announced recently. These requirements, together with the tests established for "Crown" Tested rayon fabrics, are outlined in detail in the company's Licensee Handbook.

• TEXTILE TECHNOLOGY LECTURE

M. D. C. Crawford, Technical Editor of Fairchild Publications was the principal speaker at the regular meeting of the New York Chapter of the American Institute of Chemists on May 21. This meeting was held following a dinner, set at 6:45 p.m., at the meeting rooms of the Building Trades Employers Association, 26th Floor, No. 2 Park Avenue. This gathering took place at 8:00 p.m., and featured "Ladies night."

Mr. Crawford spoke on the early history of dyeing and fabric construction. The lecture was illustrated by colored slides, and Mr. Crawford developed some of the factors influencing the design and style of present day clothing.

• 1943 FALL GLOVE COLORS

Sixteen colors for women's gloves have been adopted for the 1943 Fall season by The Textile Color Card Association's Glove Color Committee, it was announced by Margaret Hayden Rorke, managing director. In line with the Association's adopted wartime policy, its Dyestuff Advisory Committee co-operated in the selection of these colors.

Mrs. Rorke called attention to the close tie-up between the glove tones and the twelve colors recently selected for fall by the Association's Millinery Committee.

The above-mentioned sixteen colors, which are adapted to fabric as well as leather gloves, will all be portrayed in the 1943 Fall Glove Card, to be issued later by the Association.

• CHANDLER LECTURER

Dr. Willard Henry Dow, president of The Dow Chemical Company, was selected by Columbia University as the Chandler lecturer and medalist for 1943.

The citation accompanying the award named Dr. Dow as "one of the outstanding industrialists of the present generation" and noted as particularly spectacular "the achievements of the company in producing bromine and magnesium from sea water and of synthetic plastics and rubber."

The Chandler Lecture Foundation was established in 1910 in honor of Professor Charles Frederick Chandler, a pioneer in industrial chemistry and one of the founders of the American Chemical Society. Its purpose is to secure lecturers from time to time eminent in the field of chemistry and to reward their achievements with a medal. Dr. Dow is the twentieth lecturer and medalist so far honored.

He is a member of the Advisory Board of the Chemical Warfare Procurement district at Chicago, a director of the American Chemical society, a member of the Newcomen Society and Torch Club, the American Institute of Chemical Engineers and a member of the Corporation, Massachusetts Institute of Technology.

• METHOXYTRIGLYCOL ACETATE

Carbide and Carbon Chemicals Corporation now offers in research quantities for laboratory investigation a new ester, methoxytriglycol acetate or acetate of methyl ether of triethylene glycol-$CH_3(OCH_2CH_2)_3OCOCH_3$. This ester, a colorless liquid, has a boiling point of 244 deg. C. at 760 mm. Because of its structure, methoxytriglycol acetate is said to have excellent solvent powers for cellulose esters and synthetic resins. This property indicates that it probably will be useful in protective coatings and printings inks. Because methoxytriglycol acetate contains no reactive group, it will undoubtedly prove to be useful as an inert reaction medium and because of its low volatility and non-hygroscopicity, it has possibilities as an "anti-dusting" agent for finely powdered materials.

For information concerning this chemical, address: Carbide & Carbon Chemicals Corporation, 30 East 42nd Street, New York, N. Y.

• COMPENSATOR GATE

Birch Brothers, Inc., of Sommerville, Mass., have recently introduced and now offer to the trade a new Individual Self-contained Compensator Gate. The machine may be installed to advantage where it is desired to operate two or more existing machines in range, or may be used in new installations. It is designed to control either variable speed units such as Reeves or variable speed Motors, so as to synchronize accurately the speed of the cloth in the machines making up the range and eliminate uneven tension on the fabrics being processed.

It is claimed that, by the installation of an automatic compensator, considerable labor is saved over hand-operated controls.

• DEFENSE TESTING COURSE

For the fifth consecutive year, the United States Testing Company announces plans for its yearly summer course. The success of all previous efforts, the timeliness, and steady demand for this type of study encourages the Company officials to continue these classes.

Begun as an experiment to better consumer-business relations, the course has found a niche in proving to be a practical training period in textile testing. This training has answered a need created in theoretical textile studies by giving students the opportunity to study and operate the latest of testing equipment.

This year, as in the past, students will have the personal instruction of the Testing Company's staff technicians working under the direction of G. R. Turner, Supervisor of the Company's Textile Laboratory and instructor of a course in Textiles at Columbia University.

Planned to meet the current situation in Textiles, the course this year will include studies of current textile theories and testing procedures by means of lectures and demonstrations with standard testing equipment. Emphasis will be placed on defense testing procedures and fabrics related to the war effort and students will be made acquainted with A.S.T.M., United States Government, Army, Navy, and other standards. Instructions will cover fiber, fabric, and clothing analysis, manufacture, and testing. The identification origin and nature of the natural fibers, older and newer synthetics, such as the rayons, casein, vinyon, nylon, fiberglas, and sample swatches for reference will be included. The testing of woven and knit fabrics for such factors as construction, thread count, fiber identification, tensile strength, seam slippage, color fastness to light, washing and drycleaning will be the basis of this Defense Testing Course. A study of the new testing equipment recently developed, such as the Warmth Tester, Snag Tester, Crease Resistance and Crease Retention devices, and various shrinkage equipment will also be an important part of the course.

Classes will be held during the company's business hours and will be in session from 9:00 A.M. to 4:00 P.M. from July 12th through the 30th. There will be a small fee charged this year for the three week period to cover the cost of supplies, mimeographed text and samples necessary for the student's laboratory work. The group of students will be limited in number, in order that they may have the advantage

of individual instruction and the opportunity to work with actual testing equipment. Applicants are required to have some elementary and textile training in order that some major portion of the three weeks may be devoted to an intensified study and use of testing apparatus.

Applications which may be obtained from the United States Testing Company's main laboratory in Hoboken, New Jersey will be available, on request, to representatives of the fields of education, home economics, industry and retailing who are invited to take the course.

• NAPPED FABRICS ADVISORY COMMITTEE

The Director of Industry Advisory Committees, War Production Board, announced the formation of the following industry advisory committee recently:

Napped Fabrics Industry Advisory Committee

Government Presiding Officer: George E. Ward.

Committee members are:
Robert Amory, President
Nashua Manufacturing Company
Cordova, Alabama
Frank B. Pradley, Vice-Pres.
Eagle & Phenix Mills
Columbus, Georgia
Carl R. Harris, Treasurer
Erwin Cotton Mills
Durham, North Carolina
Harvey W. Moore, Vice-Pres.
Brown Manufacturing Company
Concord, North Carolina
H. G. Mortland
Cannon Mills Company
New York, New York
Charles B. Nichols, Treasurer
Appleton Company
Anderson, South Carolina
Theodore Riegel, Vice-Pres.
Trion Company
Trion, Georgia
L. D. Rivers
Wade Manufacturing Company
Wadesboro, North Carolina
Donald Tansill, Vice-Pres.
Pepperell Manufacturing Company
Lindale, Georgia
Frank C. Williams, Vice-Pres.
Roanoke Mills Company
Roanoke Rapids, North Carolina

• JOINS MERRIMAC DIVISION, MONSANTO CHEMICAL

Dr. Donald H. Powers has joined the staff of Merrimac Division of Monsanto Chemical Company as specialist on applications of Monsanto chemicals in the textile industry. Although his headquarters will be in Everett, Dr. Powers will serve as consultant for all Monsanto divisions on textile applications. He has had fourteen years of experience in textile research and production.

After receiving his A.B. from Boston University in 1921, Dr. Powers accepted a teaching fellowship at Princeton university where he specialized in organic chemistry under Dr. Lauder W. Jones, then head of the chemical department and professor of organic chemistry. He received his A.M. in 1923 and his Ph.D. in 1924 at Princeton, and joined the du Pont research department, where he worked on rubber accelerators, antioxidants and colors. After four years with du Pont, Dr. Powers went with the United States Finishing company. After a short time he was made chief chemist, serving as consultant and trouble-shooter for the operating men in the production departments of the finishing company's seven mills. This experience was invaluable inasmuch as the plants were producing all types of textiles and the problems were most diversified.

Dr. Donald H. Powers

In 1931 Dr. Powers went with Rohm & Haas, Philadelphia, where he assumed charge of the textile division handling sales and research for textile chemicals. His research has specialized in the application of synthetic resins to textiles and enzyme applications.

Dr. Powers is a director of the Textile Research Institute, Inc., has served as chairman of the Providence section of the American Association of Textile Colorists and Chemists and also is a member of the American Chemical society, and the American Society of Testing Materials. He is the author of more than 25 patents in the textile and rubber field. In college he was a member of the Sigma Alpha Epsilon fraternity.

• CALCO BULLETIN

Calco Chemical Division, American Cyanamid Company has recently released a bulletin entitled "Typical Shades and Patterns for the French North African Trade."

Prepared from information gathered in France, this bulletin gives a comprehensive picture of the fabric construction and the patterns used for many years in the closely controlled markets of Tunisia, Algiers and Morocco.

In order to faithfully reproduce the original fabrics, it was necessary to print the bulletin in seventeen colors. To aid the interested textile manufacturer, typical formulae have been given and prints wherever possible have been made to full size of the original.

Enlarging on the construction of fabrics and their finishing, a table has been prepared showing type, count, width and finish.

Many manufacturers and finishers will find interest in the fact that patterns in print goods are similar in many cases to those used in America and that some shades popular in North Africa are also those of high choice in this country.

Calco Technical Bulletin No. 695, may be procured by addressing Calco Chemical Division, American Cyanamid Company, Bound Brook, New Jersey.

• AATT MEETING

The speaker at the June 4th meeting of the American Association of Textile Technologists will be Dr. K. L. Hertel, of the Fiber Research Laboratory, University of Tennessee. His subject will be "New Methods of Measuring and Property of Cotton Fibers."

• DURAPEL

L. Sonneborn Sons, Inc., have announced a new durable type of water repellent under the trade-name of Durapel, U. S. Registry No. 458,292.

• BOOKLET ON SYNTHETIC RUBBER

United States Rubber Company, which last week placed in operation one of the world's largest synthetic rubber plants at Charleston, W. Va., has used all available types of synthetic rubber in its products since 1932, according to a booklet, "The Five Commercial Types of Synthetic Rubber," recently released by the company.

Compiled for sales engineers of the rubber company, the booklet has been called the first technically accurate statement of the overall synthetic rubber situations which can be understood by the layman.

It traces the development of synthetic rubber from its laboratory beginnings, describes the properties of the commercial synthetic rubbers, and relates briefly the part played by United States Rubber Company in their development, manufacture and use in its products.

The publication includes photographs of synthetic rubber manufacture, many diagrams, and a chart compiled from the experience of plants and laboratories of the company, giving the relative physical and chemical properties of natural rubber and of the five types of synthetic rubber.

It is stated that the booklet, which has had a limited distribution to government agencies and allied industry, has been cited for study by several of the foremost technical schools and colleges of the country, and is now made available free upon application to the United States Rubber Company, Synthetic Rubber Division, 1230 Sixth Avenue, New York City.

• NEW SOURCES OF WASTE FATS AND OILS

The nation's 40,000 chemists are being asked to help find new sources of waste fats and vegetable oils for salvage purposes it was announced recently by Marcus W. Hinson, senior industrial specialist of the Chicago War Production Board's salvage division.

Mr. Hinson, who was loaned to WPB by the American Chemical society to set up a national program for industrial fats and oils recovery, says that industrial needs for 1943 alone call for at least 350,000,000 pounds of fats and oil. He has set a national goal of 500,000,000 pounds but declares this will be reached only if the nation's chemists are able to discover new methods and sources of fats and oils salvage.

Chief industrial sources now being used include meat packers and processors, makers of salad dressings and margarine, canners of chicken, cotton seed and soy bean processors, and soap manufacturers. Salvage from these sources probably could be increased by improved recovery methods but one of the biggest problems is tapping new sources from other industries, Mr. Hinson said.

He asks that new ideas be transmitted to him at Room 909, National War Agencies building, 226 West Jackson Blvd., Chicago, Illinois.

• SPUN RAYON HANDKERCHIEFS

"Crown" Tested spun rayon handkerchiefs that meet all requirements of the American Viscose Corporation's "Crown" Tested Plan are now being produced in considerable quantities and are available in many of the country's leading retail stores. Data on the construction of the fabric for these handkerchiefs was worked out in cooperation with the American Viscose Corporation's Fabric Development Department, and a finishing formula to provide the required degree of absorbency was developed by the "Crown" Tested Department, working in collaboration with the converter and the finisher.

The principal specifications that each print lot of the handkerchief fabrics must meet to qualify as "Crown" Tested are: tensile strength dry, 30 lbs.; tensile strength wet, 15 lbs.; dimensional restorability or resistance to shrinkage or stretch, 2 per cent; laundering temperature, 160 degrees Fahrenheit; sunfastness, 40 hours Fadeometer; absorption (Haven's method), rate—10 seconds, saturation—100 per cent.

• TENNESSEE EASTMAN REPRESENTATIVE

Herbert G. Scull, who has been engaged in dye investigations at the Eastman Kodak Company's Research Laboratories, has been appointed a technical representative of the Tennessee Eastman Corporation, Kingsport, Tennessee.

Herbert G. Scull

Mr. Scull will render technical assistance to the dyers, printers and finishers in the application of Eastman acetate dyestuffs, and in developing new and improved methods of finishing acetate materials.

Having been connected with the dyeing and printing industry for many years, Mr. Scull is particularly well qualified to render this service. His most recent work with Eastman Kodak Company was research in connection with the development of acetate dyes and the discharge printing of acetate fabrics.

Appointment of Mr. Scull as technical representative by Tennessee Eastman Corporation follows closely an announcement that Eastman is conducting research to develop improved dyes and finishing processes for acetate rayon, with emphasis on colors with higher fastness properties. According to Tennessee Eastman, Mr. Scull will correlate their research on dyestuffs with development work on the newest types of acetate fabrics.

• USE OF ETHYL CELLULOSE

Use of ethyl cellulose except on specific authorization of the War Production Board was restricted recently through issuance by WPB of General Preference Order M-175 as amended. Ethyl cellulose is used in lacquers, coated textiles and plastics.

The amended order eliminates the general 50-pound exemption for small orders and substitutes a general 10-pound exemption and an exemption of 50 pounds in the case of acceptance or use for experimental purposes.

Use of standard chemicals allocation forms PD-600 and PD-601 by applicants for authorization to deliver, accept delivery of or use ethyl cellulose is provided.

The amended order also provides that ethyl cellulose allocated for inventory may not be used except as specifically authorized or directed in writing by WPB. Ethyl cellulose allocated to fill anticipated orders for specified primary products and product end uses may not be converted into primary products in advance of receipt of actual orders for such primary products with the product end uses specified.

Ethyl cellulose allocated to fill an order on hand which is subsequently cancelled prior to the conversion of such ethyl cellulose into a primary product—and ethyl cellulose allocated to fill anticipated orders which fail to materialize—shall revert to inventory as though originally allocated therefor.

A manufacturer who uses ethyl cellulose in any product and who is required to obtain specific written authorization from WPB to receive or use such ethyl cellulose shall not accept or fill an order for such product unless the person placing the order, at or prior to the time of placing the order, shall have filed a certificate specifying the ultimate use to which such product is to be put.

The amended order was effective May 10, 1943.

• JOINS VISCOSE

Raymond Bourrioux, formerly associated with the United Piece Dye Works and the Sayer Dyeing & Finishing Company, has joined the American Viscose Corporation in the "Crown" Tested Department. Mr. Bourrioux, who is a graduate of the Bolivar School of Paris, France, majored in chemistry. He will be in charge of the dyestuff research section of the New York office laboratory.

• AWARDED BULL'S EYE

Quaker Chemical Products Corp., Conshohocken, Pa., has been awarded the Bull's Eye insignia to be attached to its Minute Man Flag in recognition of its part in advancing the sale of War Bonds. Currently, 100 per cent of the company's personnel have subscribed to the purchase of bonds in an amount which is 11.2 per cent of the total payroll.

* * *

The company also announces that Robert

S. Moore, a native of Canada, has recently joined its research staff. Mr. Moore received his M.S. degree from the California Institute of Technology and has been employed by the Oil Industry on the West Coast until coming with Quaker.

The already extensive laboratory facilities of this company are now being further enlarged by an addition to the research laboratory. This building will house laboratory offices, a library and conference room. An addition to the executive and administrative office building is also under way.

• 1943 FALL WOOLEN AND RAYON CARDS

The regular editions of the 1943 *Fall Woolen and Rayon Cards*, each portraying thirty-four colors, have just been issued to members of *The Textile Color Card Association*, it was announced recently by Margaret Hayden Rorke, managing director.

In the interests of dyestuff conservation, all of the colors in the rayon collection, with eight exceptions, are prototypes of the woolen shades and have the same names, thus reducing appreciably the total number of fall colors. Also, as compared with prewar versions, there is a noticeable lightening of tones in both the woolen and rayon groups.

• AWARDED WHITE STAR

The Hooker Electrochemical Company has been awarded the White Star to be added to the Army-Navy "E" Flag which they received on September 8th, 1942. Announcement of the second award was made by Under Secretary of War Robert P. Patterson in a letter addressed to the Men and Women employees of the company. The award is made for continuous, meritorious services on the production front.

• TIRE CORD INPREGNATING RANGE

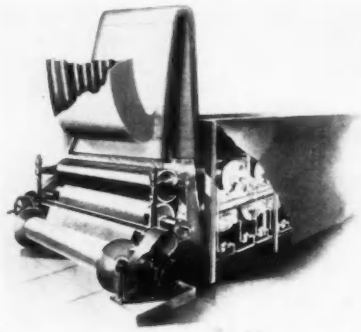
One of America's leading tire manufacturers is now impregnating rayon tire cord with latex rubber solution at high speeds on a continuous process machine.

The installation uses the padding technique of immersion in latex, squeezing between rollers and drying on cans, taking care that the solution is so adjusted to the pick-up that the proper amount of latex impregnates the rayon cord.

The range begins with the feeding of the rayon cord into a 2-Roll Micro-Set Padder. After the squeeze under four thousand pounds pressure, the cord passes through a heated flue built in the shape of an inverted "U." This pre-drying speeds up the whole process.

Next the cord passes over a series of twenty-two steam-heated drying cans, arranged horizontally, and is wound onto a slip belt winder at the end of the range.

It is stated that it takes 40 per cent less time to impregnate the rayon cord with latex in the continuous process range than the best speeds formerly attained.



Continuous process range for impregnating rayon tire cord with latex rubber solution, as designed and built by H. W. Butterworth & Sons Company for a leading tire manufacturer.

All of the rayon cord being impregnated on this continuous process range is used for military purposes, particularly aircraft tires where rayon is said to save approximately four pounds of rubber per tire, run cooler and withstand the shock of high-speed landings.

The impregnating range was designed and built by H. W. Butterworth & Sons Company.

• AWARDED AIR MEDAL AND D.F.C.

Lt. Vincent C. Rethman, former chemical engineer of National Starch Products' New York Service Department, has been awarded the Distinguished Flying Cross and the Air Medal with three oak leaf clusters for his achievements against the Axis in the North Africa theater of operations. Lt. Rethman flies a P-38.

• MAY ISSUE, TEXTILE RESEARCH

A perfectly clean cotton fiber at the gin will be the product of a new machine, according to the inventors. It will also pack the product into high density packages in such form as to eliminate the need of opening or cleaning machinery at the mill. This new development is described in the May issue of Textile Research, official publication of the Textile Research Institute, Inc., and of the Textile Foundation. Neps, seed chips, motes and other trash left in cotton at the gin and imbedded in the fiber by the compress, have constituted an important item of cost to the mill in their removal and a major cause of difficulty in producing a uniform yarn. This is even more true of high-density packing urged upon the industry as a wartime measure for saving space in transportation. Furthermore, the adoption of adequate cleaning machinery at the gin should remove a major handicap that has prevented the use of mechanical pickers for harvesting the crop. It is obvious that this process would result in raising the grades of cotton as marketed.

Increase in the warmth and decrease in the bulk and weight of clothing, bedding and other equipment for the Armed Forces has been a development of major importance in the conduct of this global war. One means of attaining "Warmth Without Weight" that is receiving the attention of research workers is the application of heat reflecting films to textiles. Textile Research for May describes some experiments conducted by one of the early workers in this field.

Some of the physical properties of nylon as revealed by a survey of the scientific, technical and general literature is the subject of another article in the May issue of Textile Research. This literature survey and compiled data will be especially helpful to research workers and to companies engaged in the development of nylon and other synthetic fibers.

OBITUARY

JOHN H. BARTON

JOHN H. BARTON, former president of the National Oil Products Company, died on May 9th at his home near Flemington, N. J. He was 53 years old.

Mr. Barton retired as president of National Oil Products in 1938 and since then had devoted his attention to the management of his farm. He was widely known in the textile, leather and commercial feed industries for twenty years. He was first associated with National as sales manager and later as vice president in charge of plant construction and maintenance.

He was a director of the West Hudson Trust Co. of Harrison, N. J. and was one of the owners of the Annandale Milk and Cream Co. of Annandale, N. J. He was a Shriner and a member of the Newark Athletic Club.

He is survived by his wife and a sister.

Post War Textiles

J. E. Bullard

THE cotton-textile industry was a major casualty of the last war. Yet, while cotton mills experienced difficulty in getting enough business to keep busy, the rayon industry was born and grew to major proportions. As has happened so often, the old non-research minded industry experienced grave difficulty in competing with the new research minded industry. Today, it is more apparent, than ever before, that money spent in research is the best insurance of future prosperity. Because the cotton industry has become more and more aware of this fact and is spending more and more money for research it can be anticipated there will be a material increase in the use of cotton after this war.

One feature of research, however, which needs to be given careful attention is what has been forced upon us by vital materials shortages. To a greater and greater degree research has been called upon to solve problems such as making a material never used for the purpose serve with entire satisfaction where a material now scarce has seemed indispensable in the past.

Both textiles and wood have been pressed into service for purposes they could not serve had not research found a satisfactory way. As a result both these old industries have been rejuvenated to such a degree there is more enthusiasm in regard to their future than ever has been the case before.

What has taken place on a large scale is exactly what some very successful concerns in many different industries have been doing for years. Problems have been solved by making a given material serve a purpose it never has served before. A small manufacturer of special machines stated in 1936 he had not laid off a single employe since the depression started. The reason, he explained, was that his entire sales department was searching for problems which he could solve by building a special machine. His research department solved more problems after the depression started than it ever had before. Because those problems were discovered and the solution of them found, this firm prospered when others were experiencing difficulty in making ends meet.

For the duration of the war, it is not necessary to search for problems to solve. Present day warfare creates them faster than they can be solved with entire satisfaction. After the war, however, the prosperity of any industry may depend, to a greater degree than ever before, upon the intensity with which it seeks new problems to solve. This is likely to be especially true in the case of textiles.

Of one thing we can be reasonably certain. Many new and old materials are going to be used after this war for purposes and in ways they never have been used before. In a great many cases, at least, it will be a combination of materials which makes the new uses practical. Just as synthetic glues have made possible and practical many new uses of ply wood so new developments in textile dyeing and finishing are certain to make possible entirely new uses of textiles. These new uses may be in connection with other materials.

The degree to which new uses are found depends much upon the success with which manufacturing problems in other industries are solved through research in the textile industry. This success, in turn, will depend upon the effort made to find new problems and to study those problems in the field as well as in the research laboratory. A very important part of post war research, therefore, is bound to be the searching for problems which can be solved by the textile industry and then studying those problems in the mills or factories where they exist.

There are certain things which it is vitally important be done after this war to insure prosperity. One is a speeding up between the source of raw material and placing the finished product into the hands of the consumer. This means a speeding up of transportation and a speeding up of manufacture. Every step in production must keep pace with all other steps. There must not be any slow ones. Otherwise, the overall speed of manufacture is slowed down.

After this war, the total public debt, that is the federal, state, county, city, town, school district and any other debt owing unit of government added together will be precariously close to the total national wealth. This means a larger volume of business will have to be done with a given capital if the national income is to be sufficient to meet the carrying charges on the public debt, pay the cost of government and leave enough over for the average family to maintain a high standard of living.

This means the capital turnover in private industry must be speeded up. It means that any research along the line of such speeding up will be of extreme value.

In some cases a speeding up in production may prove more desirable than a saving of material and labor cost. In the automobile industry, the painting of cars proved a limiting factor in mass production until new, fast drying paints were developed. It is not beyond the bounds of reason to imagine an automobile body made with a combination of wood, textiles and synthetic glues which would come from the press completely finished, the outer and the inner surfaces of the body being textiles given the desired finish in regard to texture and color by mass production processes before being incorporated into the body.

Regardless of how visionary such an idea may appear now, the fact remains that speed in production is bound to be of far greater importance in the future than it ever has been in the past. The greater the degree to which chemical and other textile research is directed in this direction, the greater the prosperity the industry may expect and the more it will have accomplished in making other industries prosperous.

The time required for material to pass from the receiving end of any factory to finished products at the delivery end is going to be vital in the coming years. Allowing it to be too long could prove disastrous. Shortening it by

a considerable amount spells prosperity. It must not be forgotten that all business and industry, after the war, when the total public debt has risen to dangerous limits will be in much the same position as the man who starts in business with too little capital. Success is going to depend upon how much the available capital can be made to do, how many times in a year it can be turned, how hard each dollar is made to work.

Planning Corporate Research and Development*

H. Wickliffe Rose
American Viscose Corporation

THE responsibility of large industrial corporations to conduct research on a broad scale in order to do their part in planning for the future social and economic well-being of the country was stressed. A discussion of patents and their relation to corporate research was included.

"The larger the industrial corporation and the more complex its business, the more people it involves, and the larger its place in the social structure of the country, the more necessary it becomes for its management to maintain a perspective gained by all these considerations, and to contribute its share in planning for the future," Mr. Rose emphasized.

"In a highly competitive business, research is considered necessary to the survival of the corporation. In fact, research creates competition and in many industries a competitive race in itself," Mr. Rose said. "It is argued by some that research creates wealth by increasing the market value of the corporation. At least it creates products, jobs, and whole industries, and certainly they create wealth in turn.

"One prospect which seems to be fairly certain, if we can reason by analogy, is that after the war there will be a tremendous surge of research, development, and production. Statistics of the Patent Office show that during each war there has been a leveling off of the number of patents issued, but following the war in each case there has been a sharp rise in the number.

"Following the Civil War the number had tripled by the second year. After the Spanish American War the number increased almost steadily from approximately 42,000 in 1900 to approximately 70,000 in 1914. After the World War the number jumped to over 90,000 in 1921. The patent curve follows very closely that of economic prosperity.

"Reading such charts, one can hardly fail to note the depressions that follow these booms after each major war. Reasoning further by analogy, and assuming that there will be a business boom after the present war, the natural reaction is to try to guard against the depression which seems to be nearly as inevitable. The planning of research, patents, building, and expansion should extend at least that far in the future."

Research today is being used broadly with sixteen objectives, Mr. Rose pointed out. These are: to improve production technique, lower production costs, modify products, improve products, create new products, conserve materials, provide raw materials and supplies, create employment, inform employees, improve working conditions, improve environs of plants, assist customers, assist consumers, widen markets, develop specific information, and advance the general field of knowledge.

Referring to the progress of research in the rayon industry, Mr. Rose said: "The rayon industry, after thirty-two years of production and development, has reached a level of basic technique, but it has by no means exhausted all the possibilities, and that level is not a ceiling. In every one of the sixteen subjects listed above work is actually being done in the industry, and patents are being issued every week covering inventions or improvements in these subjects. In general the commercializing of the useful patents has been accomplished, not only by the inventor putting them to work but by his offering them on a liberal basis, which has permitted their use by others. There is no patent pool in the industry, but it has been found that liberality in terms enables competitors to use the same invention while the owner of the patents enjoys a modest return."

"We expect to see an increased use of rayon and synthetic textiles," Mr. Rose said in conclusion. "We are planning improved and new products for the time when peace returns to the world, and we assume that other corporations are doing likewise. We expect to see textiles of new beauty and utility add to the enjoyment of that world, both in garments and as house furnishing. We expect to see rayon used for its ruggedness in an increasing number of ways, which would surprise the inventors of artificial silk. We will undoubtedly see new metals, more synthetic metals and materials, for metallurgy and chemical synthesis of so-called plastics are becoming closer as fields of science.

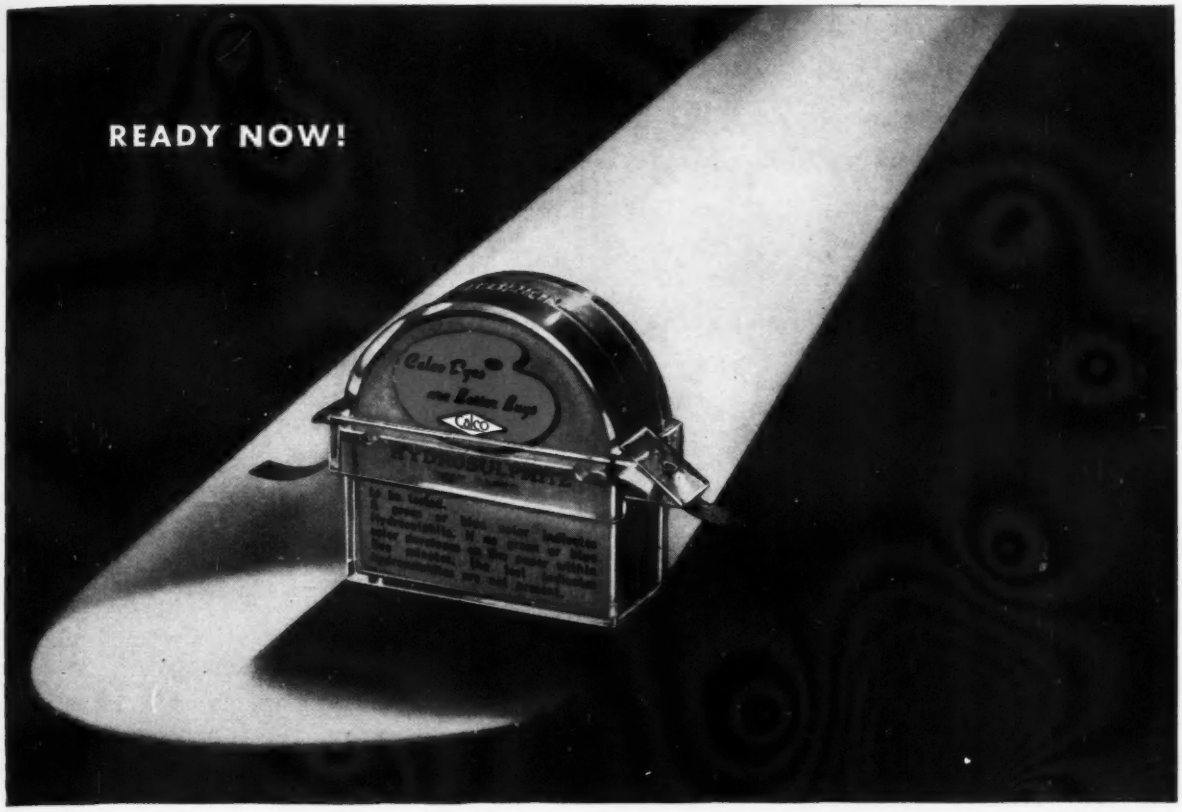
"The signs are all around us. Wonderful accomplishments of industry for the war program, pointed out with just pride in advertisements today, give only tantalizing hints of what is being stored up in potentialities for the future world."

*Abstract of an address delivered before the Practicing Law Institute, April 19, 1943, New York City.

•CLASSIFIED• ADVERTISEMENTS

WANTED: ASSISTANT DYER: Man with experience in handling cotton and rayon on pads and jigs. Curtain goods experience will be helpful. Location, Southern Massachusetts. Write Box No. 438.

POSITION WANTED: Demonstrator and dyer with experience in all departments of textile mill. Now employed as superintendent of application laboratory and technical staff of large dyestuff concern. Would consider position as demonstrator or assistant of sales manager. Thirty-nine years of age. Draft exempt. References. Write Box No. 442.



CALCO'S HANDY HYDROSULPHITE-CAUSTIC INDICATOR

HERE'S ANOTHER test kit that's equally as useful for textile men as Calco's PH indicator.

As you can see from the actual-size illustration above, it's conveniently small as any pocket-size tape-measure.

This Calco tester has an air-tight, moisture-proof transparent case which holds both hydrosulphite and caustic test-tapes.

Here's another example of the practical value of Calco Technical Service . . . devoted to helping you use Calco dyes for *best* results.

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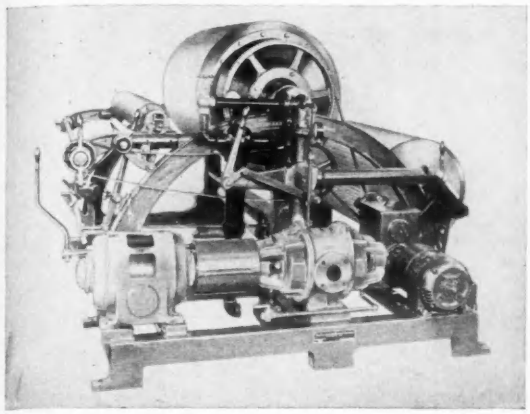


DECATING IMPROVES FABRIC FINISH

Viscose, acetate, Aralac and certain cottons and knitted goods can be made more appealing to the eye and hand—easily and inexpensively—by decating.

Using only one operator, this decater has by test, produced 250 yards more per hour than other machines requiring two operators.

The decating of piece dyed fabrics results in an improved quality at lower cost, due to the absence of breaks, harshness and other undesirable faults. It also results in added savings because of the smaller amounts of softening materials required. Printed fabrics show the additional advantage of decreased mark-offs, due to excessive amounts of oil which is necessary unless the piece is decated.

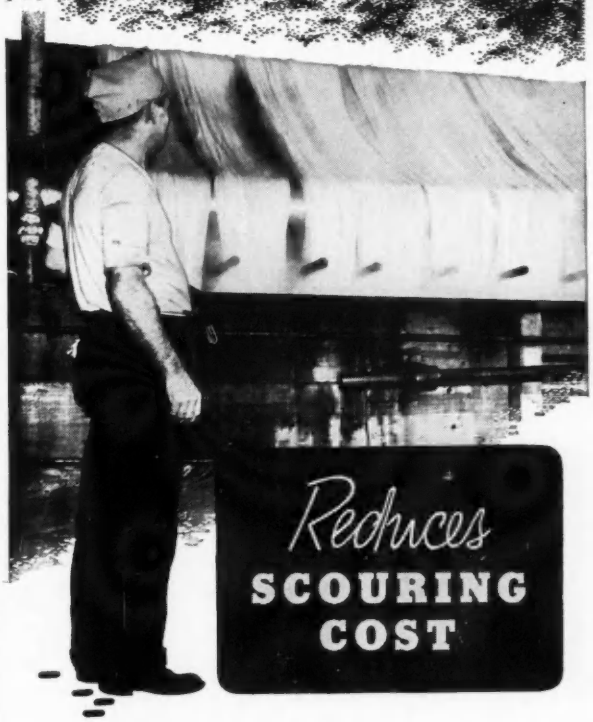
Since its introduction in 1937 a number of improvements have been made, making this decater faster and simpler to operate. The machine is sturdily built and complete in every detail. Just hook up steam, water and electricity.

VAN VLAANDEREN MACHINE CO.

370 STRAIGHT ST., PATERSON, N. J.

World's largest manufacturer of synthetic fabric processing machinery

METSO



HERE'S your opportunity to cut corners without cutting your quality. Use Metso Granular for scouring. It loosens all those impurities such as oils, loom dirt, sizes and gets rid of them for good.

How? There's the scientifically proportioned silica content in Metso which aids in dirt removal and also prevents the re-deposit of soil on the clean fabric. This superior detergency saves time and saves soap, because a pound of soap does more work when its partner is Metso.

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ONE "QUICKIE" SALVAGE JOB ISN'T ENOUGH

YOU'VE JUST BEGUN TO SCRAP!

"ONCE OVER LIGHTLY" doesn't even *begin* to turn up the full scrap potential of the average industrial plant. Tremendous quantities have been either neglected or overlooked.

Yet today, as American boys come to grips with the enemy, demand for scrap of all kinds—especially copper, brass and bronze—soars beyond all anticipations. The War Production Board stresses *again* that the enormous demand for copper scrap cannot possibly be met. It's our No. 1 salvage problem!

LOOK OFTEN—LOOK HARD!

So be ruthless with that old stuff that's been collecting dust since the Year One! Put a strong-arm executive in charge of your salvage operation and make it a *continuous* job! Tell him to use commando tactics if necessary, but to keep that scrop coming.

It's amazing what the second and third time around will yield when everybody is convinced that you mean business. Out they come—hidden tons of ancient parts and fittings, useless dies and jigs, everything from cotter pins to drill presses!

KEEP THOSE FURNACES GOING!

America's copper refineries are operating at an average of 80% of capacity. Think what that means! In some hard-fought action, the cartridges just won't be there. *And your boy, or your neighbor's kid, will pay the price!*

WHAT IS DORMANT SCRAP

Obsolete machinery, tools, equipment, dies, jigs, fixtures, etc., which are incapable of current or immediate future use in the war production effort because they are broken, worn out, irreparable, dismantled or in need of unavailable parts necessary to practical re-employment.

FOLLOW THIS RULE

If it hasn't been used for three months, and if someone can't prove that it's going to be used in the next three—sell it*—or scrapt it!

***Scrap and used equipment dealers pay well for usable machinery and materials.**

If you put it off, you postpone victory. And a lot of swell fellows are going to have to spend just that much more time in the blood and muck of trench and fox-hole. You can't let that happen!

Not while our steel mills alone need 13,000,000 tons of purchased scrap in the first half of 1943 to keep charging their furnaces!

USE IT—SELL IT—OR SCRAP IT!

Maybe you can't use some good machinery—yet it hasn't reached the scrap stage. Okay—sell it. Usually somebody else is looking for that equipment. You'll get prices far better than those for scrap. And you'll do your Uncle Sam a good turn into the bargain.

HOW TO SELL YOUR SCRAP

If you have no regular scrap dealer, find one in the classified phone book. He'll buy usable materials, too; or you can find a Used Equipment Dealer in the same place.

Don't expect your scrap heap to be a gold mine—the dealer works under a price ceiling, the same as you do. But you will find there's a million dollar feeling in the knowledge that you're doing your part all the way. It's 100% better than the guilty sensation you get every time you pass some good metal you should have scrapped months ago!

BUSINESS PRESS INDUSTRIAL SCRAP COMMITTEE

ROOM 1261, 50 ROCKEFELLER PLAZA, N. Y. C.

If you have done a successful salvage job in your plant, send details and pictures to this magazine.

SEND FOR PRIMER OF INDUSTRIAL SCRAP TO HELP YOU TACKLE THE SALVAGE PROBLEM

B. A. No 5

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Please send a "Primer of Industrial Scrap" to

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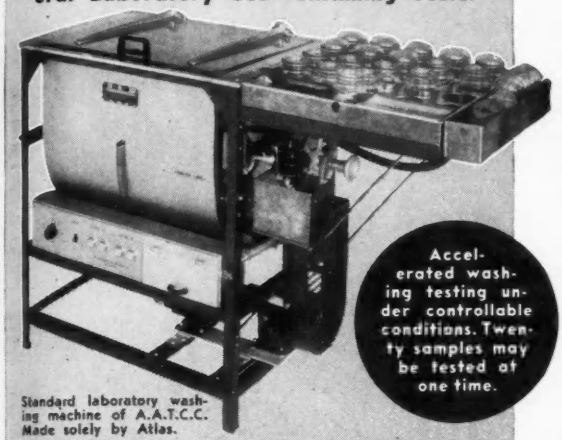

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DESPITE war restrictions Onyx chemical research is making progress in the processing and finishing of Rayon Yarns—Fabrics and Hosiery. Each day contributes some improvement that enables mills and dyehouses to make better Rayon products. Onyx research chemists and field technicians working with the textile industry are gradually overcoming many obstacles. Much of the improvements in Rayon can be credited to new finishing materials and methods employed. In this work the Onyx organization have had a long experience and recent intensified efforts gives them an intimate knowledge of the many problems involved. If you too have a problem in Rayon, perhaps Onyx can be of service. Your inquiries are solicited.

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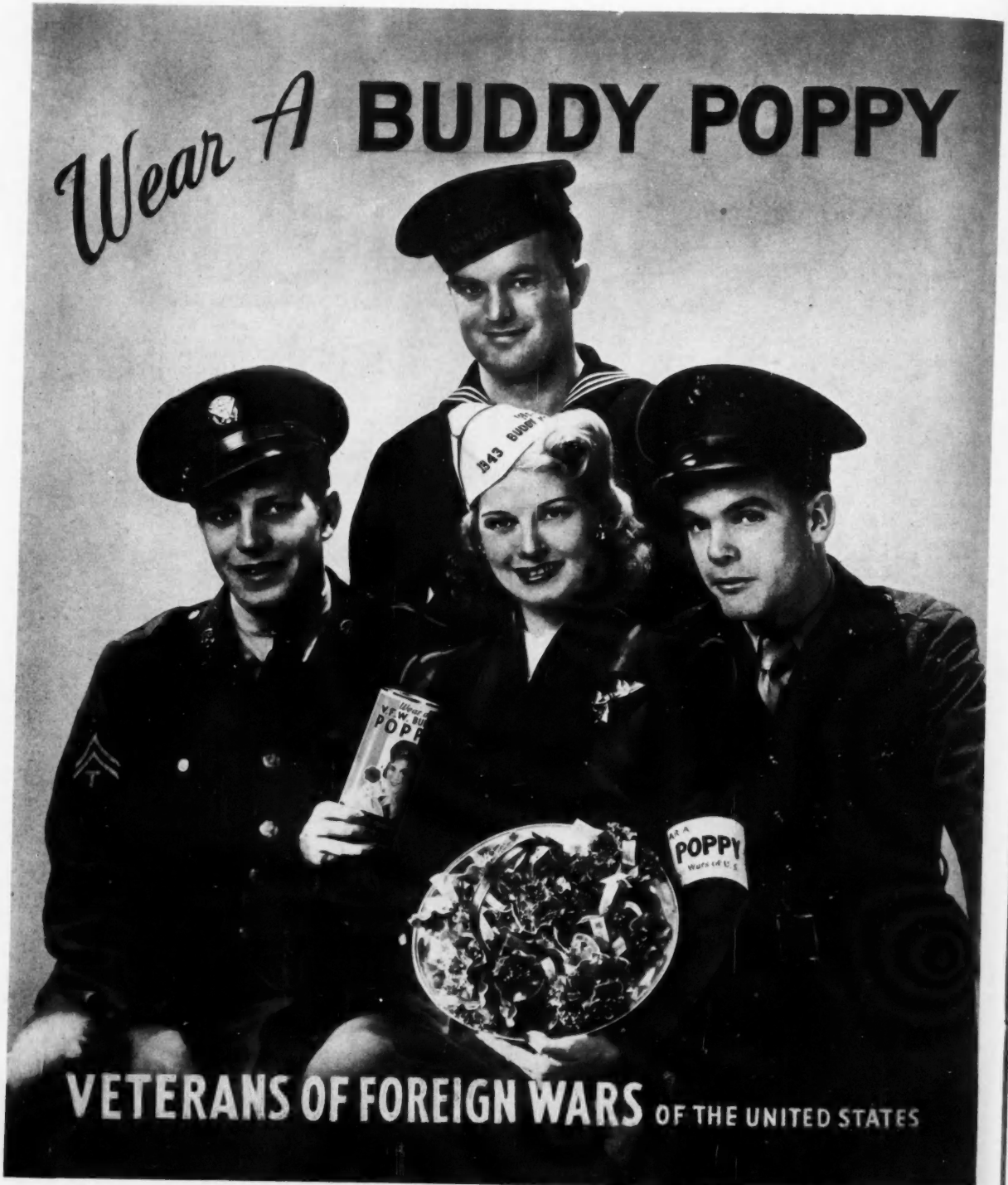
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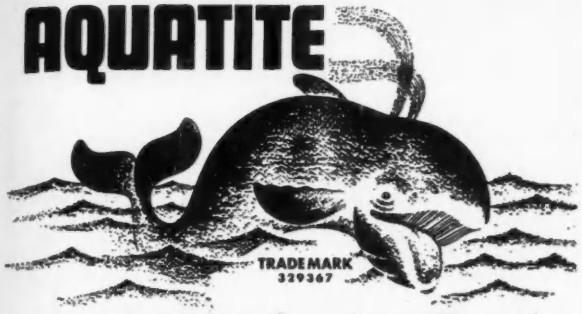
POPPY
VETERANS OF FOREIGN WARS OF THE UNITED STATES

AQUATITE



A Whale of a Finish

AQUATITE, A

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(NO. 5 OF A SERIES)

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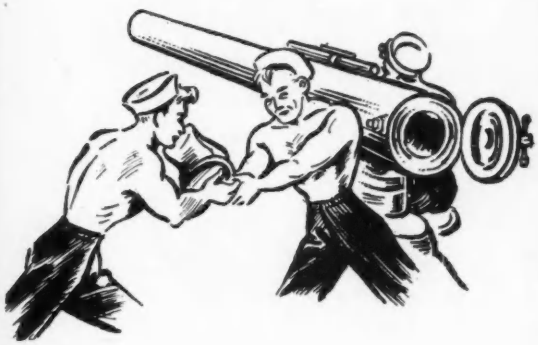

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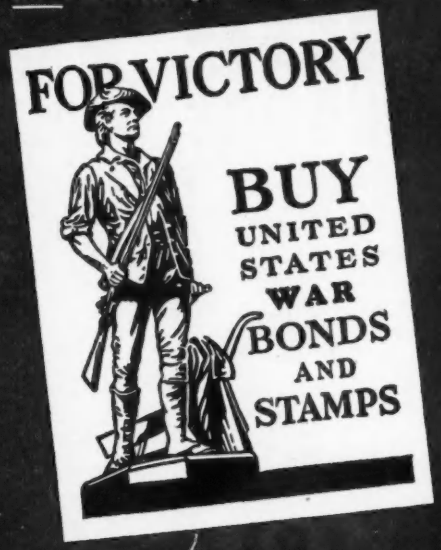

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